



WORKING PAPER

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**INTEGRATING NTDS: OVERLAPPING THEMES  
AND PROJECTS IN THE GERMAN  
DEVELOPMENT COOPERATION PORTFOLIO**

on behalf of the  
German Network against Neglected Tropical Diseases (DNTDs)

## The German Network against Neglected Tropical Diseases (DNTDs) e. V.

is a national platform that cooperates with international partners to fight more strongly against poverty-related and neglected infectious diseases (NTDs, Neglected Tropical Diseases). The German network is committed to the London Declaration on NTDs, and aims to support the World Health Organisation (WHO) as well as programs in the affected countries in controlling, eliminating or eradicating at least ten of the altogether 20 NTDs by the end of the decade.

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# ABSTRACT

Neglected Tropical Diseases (NTDs) are intimately related to poverty and poor living conditions. Often the disabling consequences of NTDs become apparent and are unrecognised in other health areas (co-morbidities). Yet, those consequences are largely preventable by large scale treatment starting early in life, as well as by some of the most basic development infrastructure and interventions.

The occurrence of NTDs, as a tracer of poverty and inequity, provides an opportunity to monitor the capacity of health systems to achieve Universal Health Coverage (UHC) and implement large-scale preventive action to eliminate disabling infectious diseases in populations that are left furthest behind. This working paper aims at exploring the integration of NTD interventions in primary health care health services and multi-sectoral

development, and the bridges that can be built between so-called vertical and horizontal health programs, i.e. programs that address single diseases vs. those that address health systems as a whole. For that purpose, the authors identify and outline operational and strategic 'assets' of programs against neglected tropical diseases (NTDs), i.e. processes, platforms, and characteristics of NTDs and the respective projects.

By integrating NTD programs and NTD program components into other health programs and cross-sectoral programs (e.g. WASH (water, sanitation and hygiene) and nutrition) these assets can be put to work for a more effective and/or efficient achievement of common goals between formerly separate programs. The authors illustrate those assets by analysing selected ongoing projects in the German development

portfolio. These case studies can serve as support for future analyses helping to build integrated development projects that embed the cross-sectorial and pro-poor focus of the sustainable development goals (SDGs).

Berlin, October 2018

# INTRODUCTION

## 2.1 Diseases of neglect and progress in combatting them

Since the beginning of the current millennium, Neglected Tropical Diseases (NTDs) have emerged as a group of poverty-related diseases of global significance in the international health and development agenda. NTDs occur predominantly in tropical or sub-tropical environments. They were previously looked at in isolation as high-burden (but rather localized) health problems of which the public health relevance was rapidly diluted when priorities needed to be set at national, regional or global level. This neglects that there are more than two billion prevalent cases of NTDs worldwide – with intestinal worm infections representing about 75 percent of all NTD-infections (see table 1 below).<sup>1</sup> At the turn of the 21st Century, their collective burden of disease, calculated as DALYs, was Tuberculosis (TB).<sup>2</sup> Even though there has been major progress in the fight against Neglected Tropical Diseases over the last 15 years, their numbers continue to remain impressive. This burden is represented in the concept of DALYs (Disability Adjusted Life Years) which accounts for premature deaths due to those diseases as well as their debilitating and disabling effects. According to this indicator NTDs still account for the fourth largest burden of disease from infectious

diseases – after HIV/AIDS, TB, and malaria.<sup>3</sup>

Yet, even though a few NTDs cause high mortality (see figure 1 page 7) most of them cause important chronic morbidity, e.g. through permanent disablement. As a result, the current residual burden in terms of *Years*

*Lived with Disability* (YLD), unlike the Years of Life Lost (YLL), remains three times as high as for priority communicable diseases such as malaria.<sup>4</sup>

Thus, NTDs are disabling diseases that represent medical poverty traps that affect more than 1.5 billion people globally in more than 100 countries,

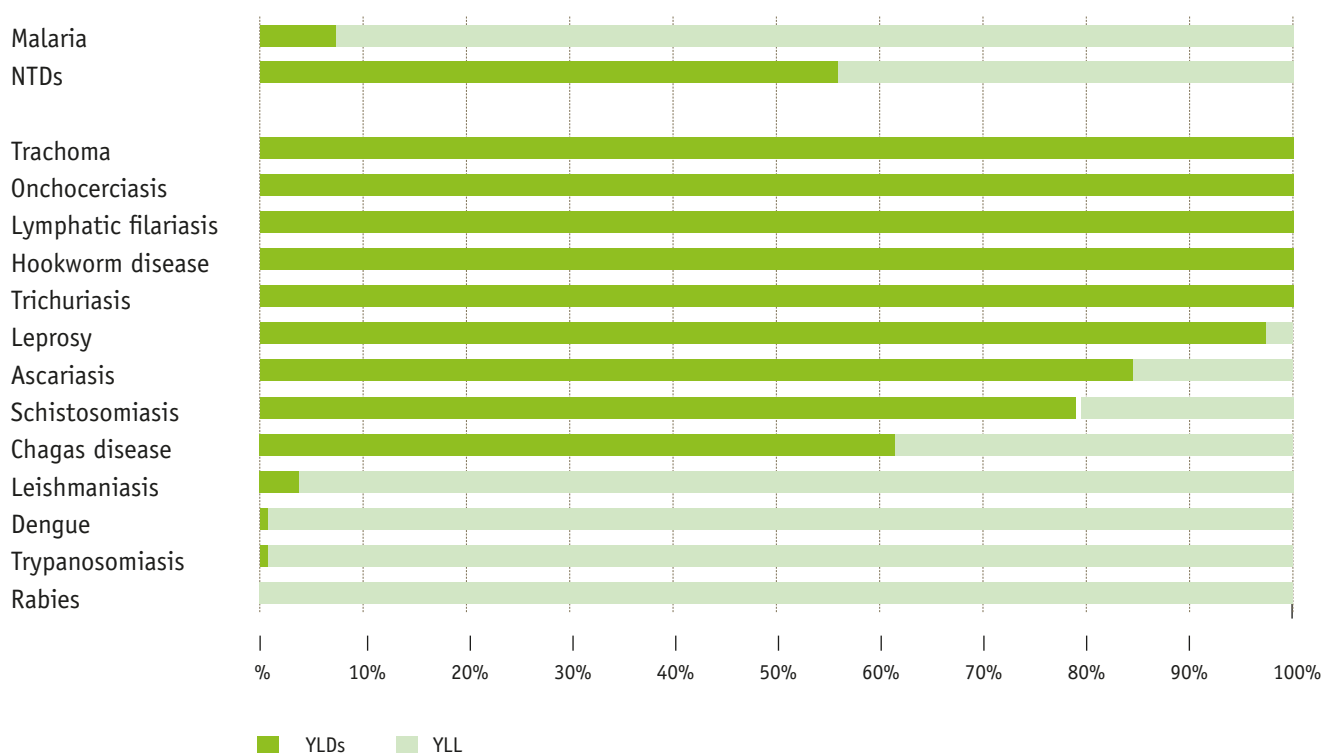
**Table 1: Prevalence of NTDs and changes since the beginning of the 1990's**

Disease	Prevalent cases (millions), 2013	Change since 1990 (in %)
Ascariasis	804.4	-25.50
Trichuriasis	477.4	-11.60
Hookworm	471.8	-5.10
Schistosomiasis	290.6	30.90
Trematodes	80.2	51.10
Dengue*	58.4	610.90
Lymphatic filariasis	43.9	-32.10
Onchocerciasis	17	-31.20
Chagas disease	9.4	22.40
Other NTDs	68.74	

\* Represent incident cases in 2013 rather than prevalent cases.

Source: Herricks, J. R., Hotez, P. J. et al (2017). The global burden of disease study 2013: What does it mean for the NTDs? PLOS Neglected Tropical Diseases, 11(8), e0005424. Original data: Global Burden of Disease 2013.

Figure 1: Disease burden by mortality (YLL) and morbidity (YLDs)



Note: The numbers of leprosy were inverted in the original dataset.

Source: Fitzpatrick C et al. (2017). An Investment Case for Ending Neglected Tropical Diseases. In: Disease Control Priorities (third edition): Volume 6, chapter 16. Underlying data: WHO, 2012.

primarily the poorest sections of populations in the developing world. NTDs can be considered as an indicator of poverty, neglect, poor living conditions, lack of access to health services, and ensuing consequences such as malnutrition, inability to make a living, stigma and exclusion.<sup>5</sup> As such they affect not just the Sustainable Development Goal (SDG) 3 (health), but also poverty reduction (SDG 1), fight against hunger (SDG 2), education (SDG 4), gender equality (SDG 5), clean water and sanitation (SDG 6), sustainable cities (SDG 11), and climate action (SDG 13).<sup>6,7</sup>

The current approach to combating tropical diseases has originated from a series of workshops in Berlin in 2003 and 2005, with the then

Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH, German ministries, the World Health Organization (WHO) and partners.<sup>8</sup> These workshops have led to the definition of a comprehensive strategy to combat a group of very diverse diseases,<sup>9</sup> in turn leading to a global programmatic response to what is currently known under the umbrella term 'Neglected Tropical Diseases' (NTDs).

This type of global programmatic response, often referred to as "vertical" like the one adopted for HIV/AIDS, tuberculosis, malaria, and National Immunization Days (NIDs) as well as polio eradication, has enabled the mobilisation of unprecedented resources for the fight against NTDs. These include increased atten-

tion in the global public health agenda, large scale donations of medicines by the pharmaceutical sector, enhanced R&D mostly by public-private Product Development Partnerships (PDPs), financial engagement by international donors such as the US, UK and the Bill and Melinda Gates Foundation, and commitment by affected countries and a large network of global health actors and development partners. More recently, Germany has started to play an increasingly important role in the support of R&D for neglected and poverty-related diseases, too. The focus on individual diseases has also allowed substantial progress in controlling NTDs in areas where poverty prevails, and health care infrastructure is usually weakly developed. The World Health Organ-

ization has played an important role in mainstreaming this comprehensive strategic approach, as well as in mobilizing increased resources and coordinating action among very diverse partners.

Progress in intervention delivery has been most visible for large scale preventive treatment, one of the strategies to combat NTDs whereby entire populations or high-risk groups (such as school age children or women of childbearing age) are treated with single-dose medicines\* at a frequency determined by the endemicity level. As the medicines are safe and no individual diagnosis is required, the intervention is easy to deliver and guarantees in principle that all infected people could be reached. Success has largely been determined by the engagement of community-based

volunteers for intervention delivery, providing a new impulse to the well-known primary health care concept of *community-based outreach*. In 2016, more than 1 billion people, equalling 62.3 percent estimated to be a risk globally, benefitted from this intervention.<sup>10</sup>

Substantial progress has also been made with improving treatments and control tools for complex NTDs, adapting their use to resource-poor areas and as such providing access in remote areas to prevention, early diagnosis and prompt treatment for diseases such as African sleeping sickness, Buruli ulcer, Chagas disease, leprosy, rabies, and visceral leishmaniasis.<sup>11</sup> This progress is a direct consequence of the renewed ambition of endemic countries to organize an intensified management of those dis-

eases. For example, political commitment is visible not only on a national level (14 priority countries in sub-Saharan Africa have now national work plans for NTDs that are annually updated)<sup>12</sup> and on a regional level (the African Leaders Malaria Alliance – ALMA – embedded NTDs as indicators to be reviewed biannually by heads of states alongside with other infectious disease indicators).<sup>13</sup>

## 2.2 NTDs in the Global Health Transition towards 2030

The adoption of the Sustainable Development Goals (SDGs) in 2015 has introduced a paradigm shift for global health programs. At the core of this shift lies the principle of Universal Health Coverage: the provision of health services when and where people need them, without facing financial hardship (SDG Goal #3, target 3.8). It shifts the emphasis from global health priorities to all-inclusive health care tailored to local situations and communities. At the same time, the principle of *“leaving no one behind”* calls for special attention to ensuring equitable access to care for the specific health problems of the poorest, such as NTDs. This goes hand in hand with the need to enhance integration of NTD interventions into national health systems and peripheral health care.

Moreover, the goal of *“ending the epidemics of AIDS, TB, malaria and neglected tropical diseases”* by 2030 (SDG Goal #3, target 3.3) calls for stepping up preventive measures. For NTDs this relates to addressing their underlying socio-economic determinants – poverty, inadequate sanitation, proximity to domestic animals, livestock and infectious vectors of disease – and acting jointly with other sectors and development programs. Such integrated action across sectors will need involvement of a multitude of actors, ranging from education, water and sanitation, agriculture and animal husbandry, to environment, housing, and rural and urban development.

Meeting the specific NTD indicators to achieve SDG Goal #3 will logically lead to elimination or near-elimination

of most NTDs, to an extent that national systems and services will be able to deal with the residual burden as part of their routine services. While continuing to further expand coverage with quality care and preventive treatment services, this will require a strong focus on mainstreaming NTD interventions into national health systems and developing collaboration with other sectors.

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\* Mostly donated by the pharmaceutical industry



## 2.3 About this working paper

Against this background, this working paper aims at understanding the potential of integrating NTD-programs with other health programs and/or programs in other relevant sectors. We identify processes, platforms, and characteristics of NTDs and their programs that could be utilized more generally (for which we will use the term 'assets').

Two motivations have been most crucial for this analysis: First, the global health community still struggles to find concrete pathways for synchronizing efforts to achieve UHC (e.g. through health systems strengthening) and efforts to fight major debilitating or killing diseases. We believe that part of the explanation lies in

the 'not-knowing' of the potential operational benefits of integrated programs in achieving individual goals. Second, the structure of development cooperation is usually not designed for cross-sectorial cooperation. Units within governments, implementing NGOs, and advocacy have – often with good reason – emphasised expert knowledge in a specific area. Moreover, cross-sectorial projects raise concerns about budget allocations within organizations. Structurally, the fight between 'value for money' and 'long-term sustainability' has made the dividing lines even more pronounced, as monitoring and showing evidence for cross-sectorial or long-term projects' effectiveness is deemed to be much more difficult than for narrow projects.

The disabling consequences of NTDs – most of which become visible in other health areas (co-morbidities) – are preventable by large scale treatment starting early in life, as well as by some of the most basic development infrastructure and interventions. We hope that this working paper can contribute to the discussion about potential synergies between development programs. NTDs are just one – but as we outline an important angle to look at multisectoral collaboration and implementation.

# MAPPING THE ASSETS OF NTD INTERVENTIONS

After more than a decade of steady progress, in big part due to a strong global programmatic focus that has helped to enhance access to essential NTD medicines and to rationalize case management of complex NTDs, there needs to be a strong focus on making NTD interventions part of national health services. Even though intervention delivery has always involved national and peripheral health services, health systems capacity for monitoring, evaluation and deciding on local intervention strategies merits to be enhanced. This is expected to lead to a better integration into already ongoing (and funded) health programs and optimization of resources by better planning according to local data and situations (illustration box 1).

Intervention delivery for NTDs can provide assets to enhance delivery of additional health care activities (or benefits) into remote communities. Inversely, health and other sec-

## Box 1

The Merck praziquantel donation program can supply up to 250 million tablets per year for the treatment of schistosomiasis in school-age children in sub-Saharan Africa. This potential quantity is currently not completely used. The praziquantel needs are currently based on the estimation of school-age populations in districts confirmed to be endemic by a regional mapping exercise. As schistosomiasis is a very focal disease, building district level capacity for decision analysis and monitoring would enable to tailor the needs to the sub-district endemicity, optimize the use of praziquantel and enable to cover more children in real need in Africa. Merck KGaA is currently working on a new formulation of praziquantel that can be administered to young children – the current tablets being only suitable for children older than six.

tors can provide opportunities to enhance delivery of NTD interventions in a very cost-effective manner, by adding them on to already existing activities. The following sections will first outline ‘operational assets’, i.e. processes, platforms, and characteristics of NTDs and the respective

projects that can be utilized by other sectors. Secondly, we wish to draw attention to several ‘strategic assets’ that describe more general aspects about the fight against NTDs and that can help policy makers to identify overlaps in the goals of different sector strategies.

## 3.1 Operational assets for cross-sectorial projects

### 3.1.1 NTD assets for Health Systems

#### 3.1.1.1 Co-morbidities

Neglected Tropical Diseases cause important co-morbidities in other health areas. The impact of some of

the NTDs on some non-communicable diseases such as anaemia (hookworm and schistosomiasis), cardiac disease (Chagas disease), cancer (urinary schistosomiasis, opisthorchiasis and clonorchiasis), and chronic liver (intestinal schistosomiasis and echinococcosis) and kidney (urinary schis-

tosomiasis) disease has since long been known (see a more comprehensive list in table 2).

Table 2: NTDs as causes for chronic non-communicable diseases, 2008

Chronic Condition	NTDs as Etiologies	Approximate Number of Cases of Each Infection	Major Geographic Distribution
<b>Cardiovascular disease</b>			
Cardiomyopathy	Chagas disease	8–9 million	Latin America
Endomyocardial fibrosis	Loiasis (and other helminthiases)	13 million	sub-Saharan Africa
<b>Cancer</b>			
Bladder cancer; squamous cell carcinoma	Urinary schistosomiasis ( <i>S. haematobium</i> infection)	119 million	Africa
Bile duct carcinoma	Opisthorchiasis and clonorchiasis	6–44 million	Southeast Asia and China
<b>Gastrointestinal and liver disease</b>			
Inflammatory bowel disease	Trichuriasis	604 million	Developing countries
Megacolon and megaesophagus	Chagas disease	8-9 million	Latin America
Intestinal and liver fibrosis	Schistosomiasis ( <i>S. mansoni</i> infection and <i>S. japonicum</i> infection)	68 million	Africa, Brazil, and East Asia
Liver cyst	Amebiasis	N/A	India, Latin America
	Echinococcosis	N/A	Developing countries
<b>Chronic renal disease</b>			
Hydronephrosis and renal failure	Urinary schistosomiasis	119 million	Africa
<b>Blood dyscrasias</b>			
Anemia	Hookworm infection	576 million	Developing countries
	Schistosomiasis	207 million	Developing countries
Pancytopenia	Leishmaniasis	12 million	India, Africa, Brazil
<b>Chronic respiratory conditions</b>			
Hemoptysis	Paragonimiasis	21 million	East Asia
Asthma	Ascariasis	807 million	Developing countries
	Toxocariasis	ND	Worldwide

Note: Inconsistencies in the cases for per infection (column 3) and table 1 are due to different observations in time. We decided to report the original figures reported in the source. See more information on the data in the original source: Hotez, P. J., & Daar, A. S. (2008). The CNCs and the NTDs: Blurring the lines dividing non-communicable and communicable chronic diseases. *PLoS Neglected Tropical Diseases*, 2(10), 1–3. <https://doi.org/10.1371/journal.pntd.0000312>.

Table 3: Health threats to women resulting from neglected tropical diseases

Health Condition	Neglected Tropical Disease
<b>Sexually Transmitted Infections</b>	
HIV/AIDS	Urogenital schistosomiasis
Trichomoniasis	Trichomoniasis
<b>Social Exclusion and Stigma</b>	
Limb, breast, skin, and genital deformities	Lymphatic filariasis, Buruli ulcer, Onchocerca skin disease, leprosy, leishmaniasis
Facial disfigurement	Leishmaniasis, leprosy
<b>Reproductive Health</b>	
Infertility	Urogenital schistosomiasis, hookworm
Severe anaemia of pregnancy/lactation and high maternal morbidity and mortality	Hookworm (major), schistosomiasis (minor)
Anaemia associated with menstruation and amenorrhea	Hookworm
Congenital infection	Chagas disease, leishmaniasis, strongyloidiasis, hookworm
Low birthweight and/or premature birth from placental inflammation and maternal anaemia	Hookworm and other soil-transmitted helminth infections, schistosomiasis
Exacerbation of disease during pregnancy	Leprosy, schistosomiasis

Source: Hotez, P. J. (2009). Empowering Women and Improving Female Reproductive Health through Control of Neglected Tropical Diseases, 3(11), e559. Original evidence see publication. Translation by the authors.

But not only are NTDs important causes for non-communicable diseases that affect hundreds of millions of people. Those parasitic, bacterial, and viral diseases are also adversely affecting reproductive health of women, increasing the likelihood of sexually transmitted diseases, and lead to social stigma and exclusion. Table 3 gives an overview of the co-morbidities of NTDs and conditions in these three areas. In most of these co-morbidities women and girls are clearly disadvantaged – be

it because of biological reasons or because of social and cultural norms/role models.

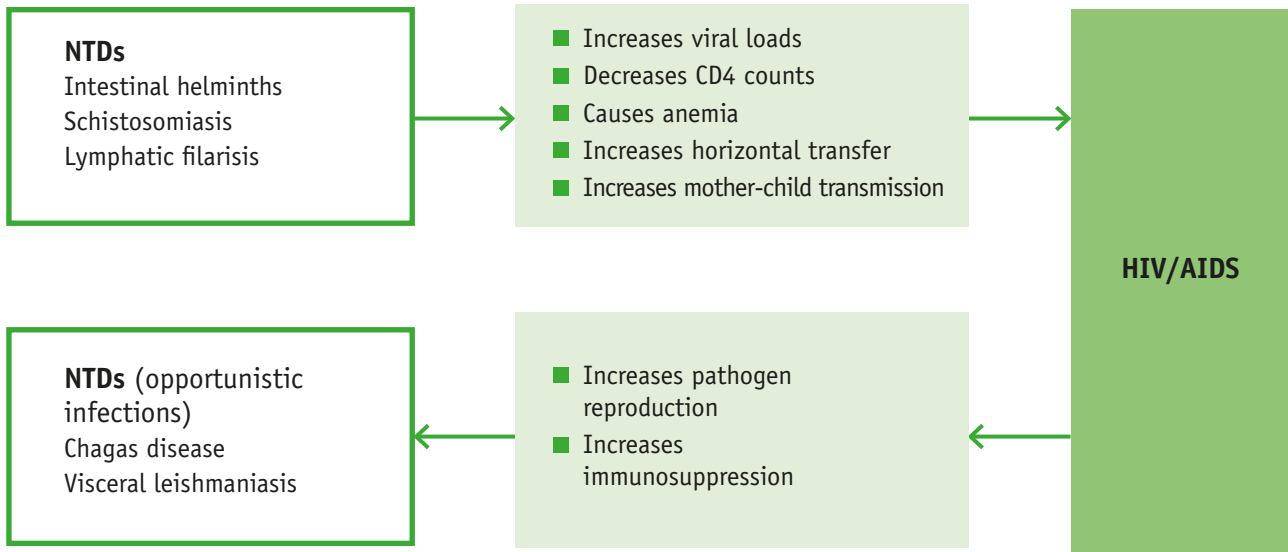
In the following sections we will analyse in further detail some of these co-morbidities that represent not only a considerable burden of disease, but also offer some striking overlaps in intervention programs. These overlaps represent a vast and increasing range of opportunities where NTD interventions can relieve morbidity in other health areas and have the potential

for a great mutual programmatic impact for other areas.

### HIV/AIDS and NTDs

The relationship between NTDs and HIV/AIDS – as schematically represented in figure 2 – is an interesting one as it runs in both directions: On the one hand side, people who have HIV/AIDS are known to develop more often the parasitic NTDs Chagas disease and Visceral leishmaniasis (VL).

Figure 2: Pathogenesis: The bi-directional relationship between NTDs and HIV/AIDS



Source: Adapted from Noblick, J., Skolnik, R., & Hotez, P. J. (2011). Linking global hiv/aids treatments with national programs for the control and elimination of the neglected tropical diseases. *PLoS Neglected Tropical Diseases*, 5(7), 1–4. Translated by the authors.

HIV/AIDS is not only leading to an increased reproduction of living pathogens in the body, but also increases the immunosuppression. Especially VL has emerged as an important opportunistic infection associated with HIV. In areas endemic for VL, many people have asymptomatic infections. A concomitant HIV infection increases the risk of developing active VL by between 100 and 2320 times.<sup>14</sup> The two diseases are mutually reinforcing: HIV-infected people are particularly vulnerable to VL, while VL accelerates HIV replication and progression to AIDS.

On the other hand, some NTDs are likely to increase the likelihood of either transmission and/or development of HIV/AIDS. For example, an intestinal helminths infection can reduce the CD4-count and/or increase the viral load and can also cause anaemia. Suffering from schistosomiasis infection increases the likelihood of horizontal transmission between individuals (see section on

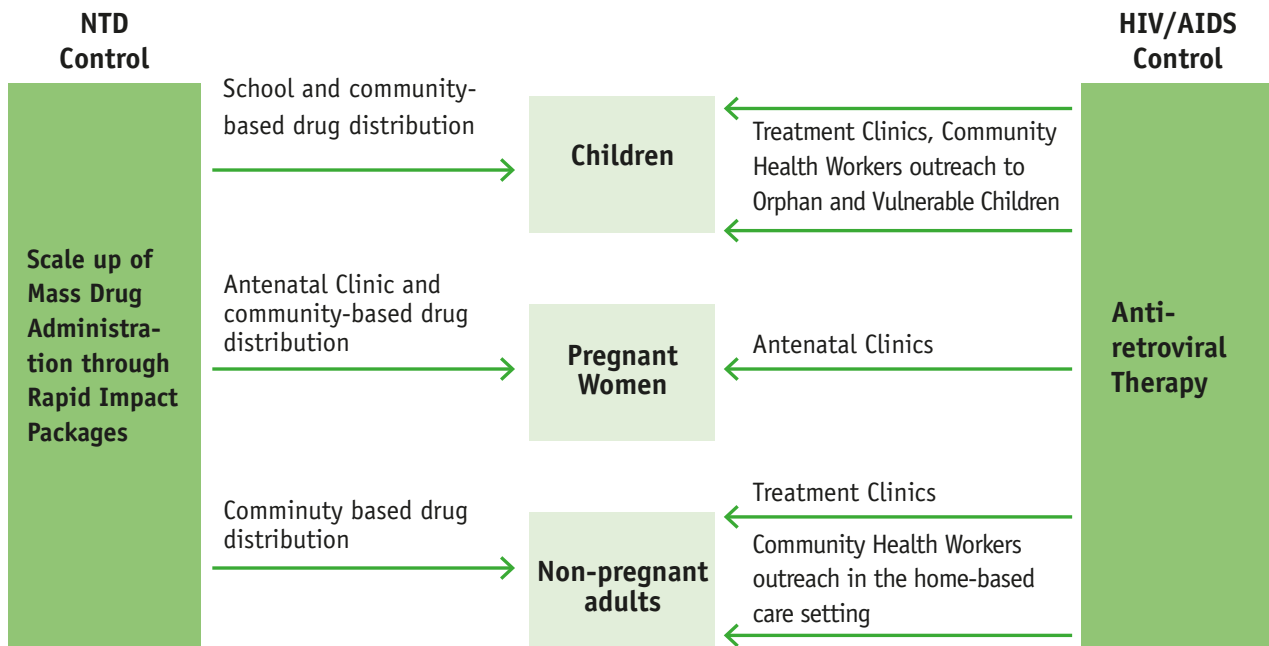
FGS below). Helminth co-infection is associated with increased risk for mother-to-child-transmission (MCTC) of HIV, possibly by a mechanism in which parasite antigens activates lymphocytes in utero.<sup>15</sup> A recent prospective study in Tanzania has even documented a significantly increased risk of acquiring HIV for lymphatic filariasis-infected individuals.<sup>16</sup>

Similar relationships between other NTDs, HIV and other viral co-infections such as hepatitis may exist. As an example, recent evidence has been brought up that HIV or hepatitis (B and C) co-infections may be associated with many unfavourable outcomes in leprosy patients, from a higher number of inflammatory complications and nerve damage to an increased relapse rate.<sup>17</sup>

These links between HIV/AIDS and different NTDs call for a closer look at the respective intervention programs and whether there are/should be an integrated approach. Figure 3

illustrates schematically how different programs directed at population groups could work together. For example, clinics that provide treatment against HIV/AIDS as well as TB and other co-infection could be stacked with NTD-medications based on regional NTD-prevalence. Vice versa, NTD-programs that reach into the most rural and remote areas could provide expanded HIV testing and care. Thus the programs could help decreasing HIV unawareness in these areas. Another example builds on the community health worker programs within HIV/AIDS programs (e.g. of PEPFAR) to reach vulnerable and orphan children. Given the ease of treatment of many NTDs with medicines, these community health workers can be trained to spot and treat possible NTD-coinfections with HIV/AIDS or refer them to a nearby health centre. This integration would help alleviate a major weakness of school-based programs that often unable to reach those children who stay (or have to stay) at home.<sup>18</sup>

Figure 3: Operative links for integrated control of NTDs and HIV/AIDS



Source: Noblick, J., Skolnik, R., & Hotez, P. J. (2011). Linking global hiv/aids treatments with national programs for the control and elimination of the neglected tropical diseases. *PLoS Neglected Tropical Diseases*, 5(7), 1–4. Translated by the authors.

### HIV/AIDS and Female Genital Schistosomiasis (FGS)

Even though gynaecological schistosomiasis has long been known by clinicians, and described in the medical literature as early as the 1940s,<sup>19,20</sup> it was in the early 1970s that the syndrome was described close to what today is known as FGS.<sup>21,22</sup> The term Female Genital Schistosomiasis was first used in the mid-1990s,<sup>23</sup> and suspected as a risk-factor for the transmission of HIV on the basis of epidemiologic, immunologic, and pathophysiologic data.<sup>24,25</sup> Even at that time the need for a specific gender perspective was already highlighted,<sup>26</sup> but one had to wait until 2006 before an association between FGS and HIV was first alleged on the basis of field data.<sup>27</sup> From there it took over a decade to further sci-

entifically document a causal association,<sup>28,29,30,31</sup> to the extent that WHO produced a visual pocket atlas for clinical health care professionals to recognize FGS,<sup>32</sup> and for WHO and UNAIDS to issue a joint technical document presenting state-of-the art evidence for its association with HIV/AIDS and advocating for large scale prevention.<sup>33</sup>

The need to consider FGS as a serious threat to the health of women in Africa stems from the terrible consequences of the illness (see box 2) and the dramatic estimates that indicate up to 150 million women and girls in sub-Saharan Africa could be affected by FGS.<sup>34</sup> The estimate is based on the evidence that between one third and 75 percent of women and girls who are infected by schistosomiasis also have FGS. This number makes it –

as the researcher Peter Hotez put it 2013 – “possibly [...] one of the most common gynaecologic condition in sub-Saharan Africa”.<sup>35</sup>

The connection between FGS and an HIV infection is based on three observations: First, cross-sectional studies in several African countries have found that adult women with urogenital schistosomiasis had 3-4-fold higher odds of having HIV. Second, among adolescent girls with FGS a higher proportion of HIV receptors on their genital tissue cells were found compared with girls that did not have FGS. Third, there is a striking geographical overlap between HIV incidence and FGS prevalence.<sup>36</sup>

Those findings lend themselves to the conclusion that preventing young girls from getting infected with Schistosomiasis will help reducing HIV infections later in life. Women who have been treated against schistosomiasis with praziquantel at least once in their life, have developed 50 percent less FGS later on in life.<sup>37</sup> And treatment of schistosomiasis has been suggested to decrease the number of HIV infections by up to 16-20 percent.<sup>38</sup>

These findings indicate that integrating the treatment of populations at risk of FGS into the traditional HIV-programs might prove to be not only cost-efficient but might also help to target poor communities first. Importantly, they address an important gender bias in HIV infections by focussing on girls and young women.

Prevention of FGS, and therefore a decrease in risk of transmission of HIV/AIDS, is indeed possible by regular treatment with praziquantel,<sup>39</sup> as long as it is given early in life in order to prevent chronic damage of the genital tract that occurs already in adolescent girls in areas where schistosomiasis prevails.<sup>40</sup> Hence the suggestion, already in 2009, that large scale preventive treatment with praziquantel in children could constitute “Africa’s 32 Cents Solution for HIV/AIDS”.<sup>41,42</sup> Inexpensive, large scale treatment

## Box 2

“FGS causes lesions and scarring in the female genital and reproductive tract. These lesions provide easy entry points for the HIV virus and can triple women’s risk of contracting HIV/AIDS. Women who have FGS also frequently have reproductive organ damage which can lead to sexual and reproductive health problems such as painful intercourse, infertility, ectopic pregnancy, spontaneous abortion, premature birth and low birth weight. Women and even young (and still sexually inactive) girls with FGS are often misdiagnosed with having a sexually transmitted infection (STI) which leads to stigma and discrimination; they often suffer from psychological problems and depression.”

In the ‘normal’ scenario of schistosomiasis, the parasites are present in the small blood vessels in intestines and bladder. The eggs that are produced continuously by the adult parasite try to penetrate the inside of those organs. From there they exit the body through urine or stool. As the sanitary situation in many countries of sub-Sahara Africa is insufficient, open defecation – often next to a freshwater reservoir – remains quite common and the water is used as a means of cleaning. These freshwater resources then become the living environment for the intermediate snail host that gets infected with the larvae hatching from the schistosome eggs, and multiplies and transforms them into a new form of larvae that can penetrate the human skin. Whenever humans then come in touch with the water there is a risk that these larvae penetrate the skin and become new adult parasites.

It is this aspect of the transmission cycle that makes women much more vulnerable to schistosomiasis. They get water from the reservoirs, wash their children, and do their laundry. Moreover, for women it is not only intestines and bladder that are affected, but also genitals. Due to the specificities of the blood vessels in the female pelvis eggs can penetrate into the uterus and the vagina.

for NTDs could indeed be added to the package of combined preventive action in girls, adolescent girls and young women and constitute an innovative way to contribute to the target of “accelerating HIV prevention to reduce new infections by 75 percent”, as stated in the HIV Prevention 2020 Road Map.<sup>43</sup>

## Anaemia and NTDs

Anaemia in low- and middle-income countries is usually a result of multiple etiological factors – nutritional, infectious and genetic. Regarding infectious (and thus preventable) causes of anaemia, hookworm infection and schistosomiasis are among the most widely encountered, together with malaria and HIV/AIDS. Childhood anaemia is therefore very common in poor communities, further amplified by poor nutritional status, and disproportionately affects women of child-bearing age later in life.<sup>46</sup> Hence the recent reminder by WHO that every girl and every woman has the right to be regularly dewormed<sup>47</sup> and that the fight against NTDs should be linked with gender programs.

## Mental health and NTDs

The burden of mental health conditions are predicted to become one of the leading contributors to the global burden of diseases by 2030.<sup>48</sup> Co-morbidities between mental health and NTDs are as old as these ancient diseases themselves. One just needs to think about the historical treatment of leprosy (social exclusion) to see what disfigurement can mean for people.

There are different ways how NTDs can affect mental health: Some NTDs directly affect the central nervous system. Neurocysticercosis (caused by the pork tapeworm) manifests itself mostly in the form of (late onset) epilepsy. The same is true for onchocerciasis associated epilepsy (OAE) or more commonly called “Nodding Syndrome”. The clinical picture of second stage African trypanosomiasis (sleeping sickness) includes psychiatric manifestations and coma. And ectopic localisations of schistosomiasis eggs in the brain or spinal cord can cause epilepsy, and hemi- or para-paresis or -paralysis.

However, the more common link between NTDs and mental health is through the cycle of depression, stigma and discrimination, exclusion from participating fully in society, lack of educational opportunities and exclusion from income-generation and employment opportunities. This particularly affects NTDs that result in infertility, such as schistosomiasis and hookworm, and in disability if

### Box 3

UNAIDS’ HIV Prevention 2020 Road Map – ‘Accelerating HIV prevention to reduce new infections by 75 percent’

Despite a significant reduction in new infections over the last 15 years, around 1,8 million new HIV infections still occur annually. Globally, adolescent girls and young women (15-24 years), account for approximately 6,900 new HIV infections every week, and out of these 5,500 were among young women (15-24) in sub-Saharan Africa.

As part of global efforts to end AIDS as a public health threat, UNAIDS, UNFPA and partners launched a roadmap to reduce new HIV infections by 75 percent. This road map intends to enhance country-led movements to scale up HIV prevention programs – combining primary prevention with the preventive effects of treatment – to meet global and national targets to end AIDS as a public health threat by 2030. The Road Map is relevant for all low and middle-income countries but focuses on 25 countries with the highest numbers of new infections in 2016, 18 of which are in sub-Saharan Africa.\*

As part of the implementation of combined primary prevention packages, UNAIDS has recently promoted the integration of reproductive health interventions in order to leverage synergies and improve women’s lives. As such, HPV vaccination to prevent cervical cancer and early schistosomiasis treatment to prevent Female Genital Schistosomiasis,<sup>44,45,33</sup> were recommended to be part of primary HIV prevention programs among school age children and girls. Adolescent girls and young women should further have access to regular screening and early clinical care for both conditions as part of Sexual and Reproductive Health and Rights (SRHR) programs, such as HIV screening, family planning, and mother-and-child health programs. In this way, combined innovative prevention programs are likely to have an enhanced and comprehensive impact, while satisfying the specific public health needs of adolescent girls and young women in the poorest settings.

\* Angola, Brazil, Cameroon, China, Côte d’Ivoire, Democratic Republic of the Congo, Ethiopia, Ghana, India, Indonesia, **Kenya**, Lesotho, **Malawi**, Mexico, Mozambique, Namibia, Nigeria, Pakistan, **South Africa**, Swaziland, Uganda, Ukraine, **United Republic of Tanzania**, Zambia and Zimbabwe. Bold = BMZ partner countries with health priority.



Table 4: Estimated numbers of existing cases of selected NTDs which cause stigma and disablement

Specific NTD	Disabilities resulting from disease	Number of cases/yr or with permanent chronic symptoms
Buruli ulcer	Disfigurement	5000/yr
Cutaneous/mucocutaneous leishmaniasis	Disfigurement	1.5 million/yr
Onchocerciasis	Blindness, severe itching	265 000 existing cases
Lymphatic filariasis	Lymphoedema	15 million existing cases
Trachoma	Trichiasis	8.2 million
Yaws	Disfigurement	2.5 million (global prevalence estimate 1995)
Leprosy	Disfigurement	213 000/yr
African trypanosomiasis	Neuropsychiatric disorders	Circa 10 000 new cases/yr

Source: Litt, E., Baker, M. C., & Molyneux, D. (2012). Neglected tropical diseases and mental health: a perspective on comorbidity. *Trends in Parasitology*, 28(5), 195–201.

untreated, such as buruli ulcer, cutaneous leishmaniasis, leprosy, lymphatic filariasis, and onchocerciasis.<sup>49</sup> Women and girls invariably suffer more from mental consequences and disorders related to NTDs.

Table 4 gives an overview of some of the most important links between NTDs and their disabling effects. Given the fact that mental conditions are often kept hidden or are not made a subject of discussion, an accurate estimation of the global prevalence is challenging. The case numbers indicated in column three of table 4 nevertheless give an indication of the extent of NTD-mental health co-morbidities.

### Child mortality and NTDs

NTD interventions delivered to remote communities that have limited access to health services can also provide unexpected collateral health benefits. For example, the effects of preventive

mass treatment with azithromycin for trachoma has shown a wide-ranging impact on other illnesses. Recent studies have established this positive effect particularly when it comes to child mortality. In 2009, a study of effects of anti-trachoma interventions in Ethiopia has shown that child mortality decreased in areas where mass treatment for trachoma had been practised.<sup>50</sup> This impact was further investigated in a cluster-randomized trial in Niger, Malawi and Tanzania. The result was that particularly children in the age group of one to five months had the greatest effect from the treatment (in the order of 25 per cent reduction in child mortality).<sup>51</sup>

### 3.1.1.2 Regular annual community health contact

The periodic, community-based delivery of NTD interventions provides at least one annual contact of remote communities with the local/national

health system. As delivery is largely carried out by resident community-based volunteers, this platform can be capitalized on to bring additional, simple interventions to these communities, to carry out screening for specific health problems and to help with surveillance of emerging diseases. Empowering communities to assist with the delivery of a simple package of interventions will contribute to building community resilience and achieving UHC.

### 3.1.1.3 NTD supply chains and health systems

Intervention delivery of NTDs is associated with a massive, but well-functioning logistics and supply chain system on which the health system<sup>52</sup> can build to improve this often-under-valued aspect of health systems strengthening. The network of pharmaceutical firms, WHO, partner countries, and NGOs has scaled the supply chain from

more than 700 million tablets in the year 2009 to more than 1.5 billion tablets in 2016 and 2017. This supply chain involves all steps from the first mile (application for drug donations,\* production, shipment, and transport to Central Medical Stores in the countries)<sup>53</sup> to the last mile (distributing the necessary drugs to the communities and the respective places where preventive medical treatment in at-risk areas is delivered).

Managing those supply chains has proven to be a challenging task. Yet, progress has been encouraging. For example, in 2015 only 20 percent of medicines for preventive chemotherapy were delivered on time, i.e. two months before date for the preventive mass treatment in the country. By 2017, this share had reached 60 percent.<sup>54</sup> Another

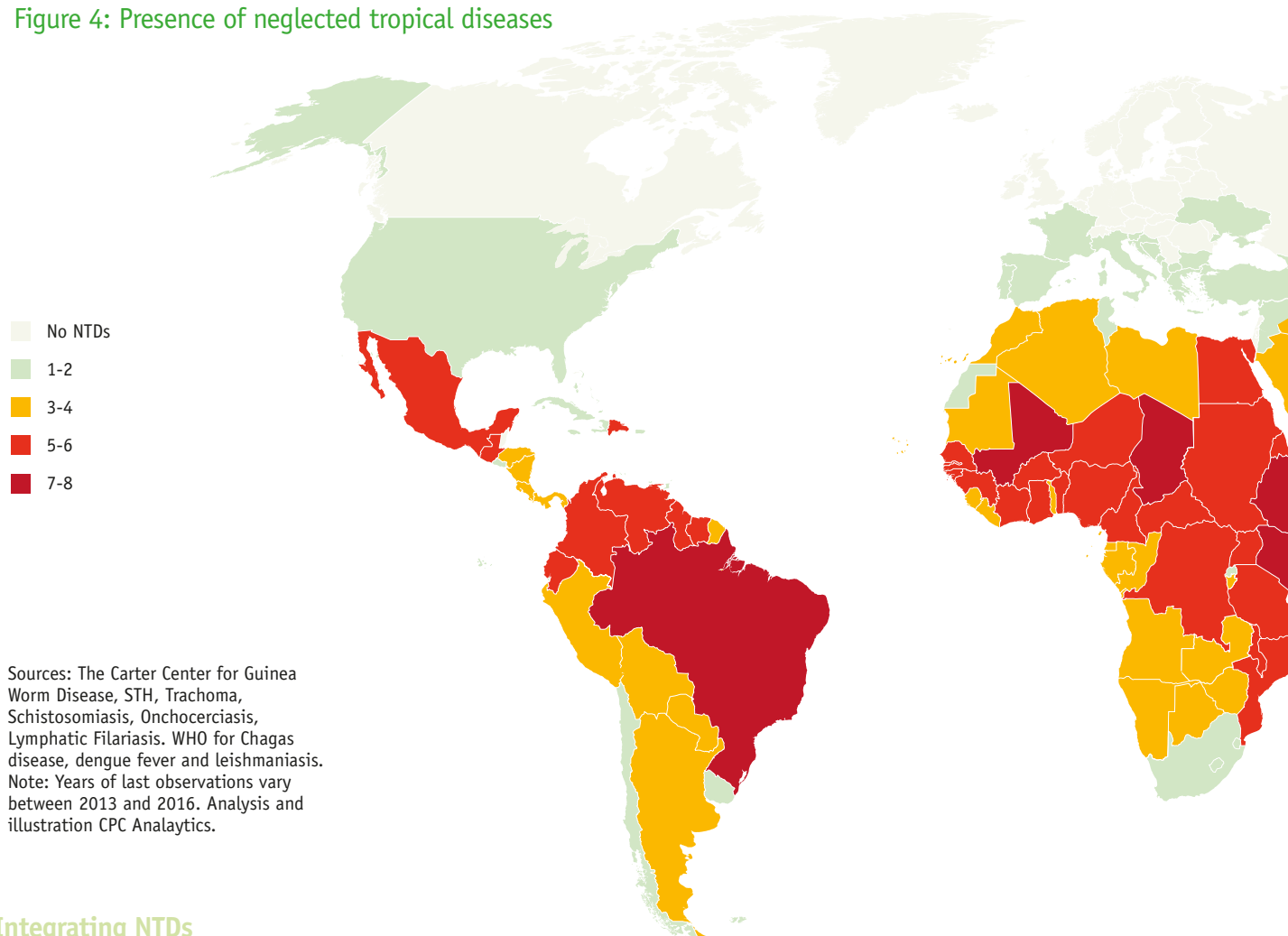
example of improvement is the reduction in unreported or mis-reported stockpiles of medicines in receiving countries. A joint mission of WHO visited 6 priority countries in 2016 and found around 180 million tablets supplied to the country between 2012 and 2015, that had been unreported for. The mission was able to find information on 73 percent of the unreported tablets. These missions show clearly that the substantial amounts of unreported medicines are neither lost nor expired but reveal the information gaps in the Supply Chain Management of medicine that exist in endemic countries\*\*

In an analysis of NTD-supply chains, the largest potential was seen in synchronizing NTDs with bednet campaigns, nutrition campaigns, and immunization campaigns. In contrast

to those, supply chains requiring frequent re-supply of commodities – e.g. essential medicines supply chains – follow usually different processes.<sup>55</sup> Better collaboration among the campaigns could theoretically range from complete ‘managerial integration’ to ‘sharing infrastructure’. One of the central overlaps seems to be the distribution network and assets. For example, one of the NTD control program managers of the NTD control program in Malawi has an agreement with the Director of the Expanded Program on Immunization (EPI) to borrow EPI vehicles when they are not otherwise being used – and in turn covers the operating costs of the vehicles.<sup>56</sup>

While the previous example highlights options for collaboration for the last mile, there have been initiatives to

Figure 4: Presence of neglected tropical diseases



streamline the first mile supply chain, too: A public-private consortium established the NTD Supply Chain Forum (NTDSCF) that created a dedicated ‘control tower’ that works to centralize management and visibility in tracking orders and shipments. The NTDSCF collaborates with the international logistics company DHL, that also contributes to the effort in kind.<sup>57</sup>

### 3.1.2 The underestimated ‘subtle’ burden of NTDs and its broad, socio-economic impact on life

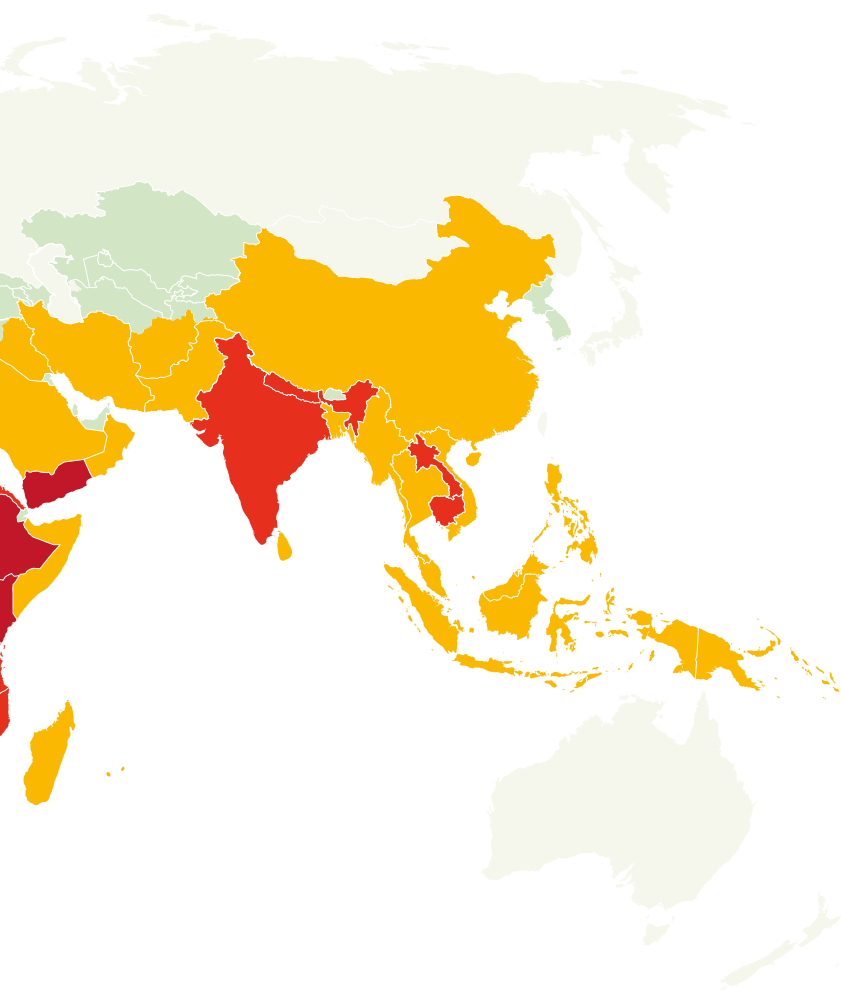
NTDs tend to cluster in the same poor populations, who are affected by multiple diseases as a rule rather than as an exception. Many NTDs, become clinical-

ly visible only at a late stage and often in other medical/health areas (see section on co-morbidities above). Before that, they cause substantial hidden or ‘subtle’ morbidity, that seriously affect children’s educational performance and adult productivity. Therefore, beyond the health sector, NTD interventions have the potential to enhance the impact of various initiatives such as food security and nutritional programs, anti-hunger campaigns, and social safety initiatives to enhance educational impact and employment opportunities. To underpin the latter, one could cite the documentation of long term economic consequences of the successful eradication of hookworm disease from the American South, which started *circa* 1910,<sup>58</sup> as well as the long-run impacts of investments in school-based deworming in Kenya.<sup>59</sup>

And even, while the impact on growth, nutrition, educational performance and worker productivity has been well described for soil-transmitted helminths and schistosomiasis, the cumulative burden of infection with multiple NTDs has so far been poorly documented,<sup>60</sup> and therefore the effect of controlling multiple NTDs on human health, well-being and life course opportunities is likely to be much more significant.

### 3.1.3 Poverty identification

The geographical occurrence of NTDs, as a proxy for poverty and neglect, can direct local authorities to areas where water supply, sanitation infrastructure and environmental improvements are most needed and will also have most impact. This is true both in rural and peri-urban areas. Because of ever increasing urbanization and international travel, cities are indeed becoming important hubs for the transmission of infectious diseases,<sup>61</sup> as shown by recent vector-borne disease outbreaks.



\* A country’s application for drugs involves more than just ordering tablets, but also “information on disease burden, number of people targeted for treatment, date of scheduled MDAs, and mechanisms for distributing donated medicines. The applications also include strategies for monitoring and evaluation, providing appropriate training and supervision to teachers and health workers responsible for distributing medicine, and preventing reinfection (i.e., provision of health education, water, and sanitation).”

\*\* The mission identified three major reasons for these discrepancies: a) information on the amount of stocks of PC medicines available at subnational and/or national level was obtainable at country level but was not accurately reported to WHO; b) some of the treatments delivered to individuals during MDA campaigns were not reported to WHO; and c) information communication gap between the programs handling the PC-medicine supplies and NTD program manager on the amount supplied, utilized and available balance.

### 3.1.4 Assets of Health Systems and other sectors to support NTD programs

Preventive or promotional programs in the health or other sectors can be used to deliver NTD interventions. Examples of such programs – well-known, but still largely under-used – are school health programs, immunization and mother-and-child health programs, as well as promotional programs for adolescents, such as in sexual and reproductive health. The logic can further be extended to other sectors where there are opportunities to reach specific risk groups during their life course, such as through professional groups and cooperatives, agricultural support initiatives, nutritional programs, etc...)

Making sure that NTD requirements are met in building, renovating and equipping health infrastructure (including

laboratories),<sup>62</sup> as well as strengthening health information systems, would greatly help enhancing national diagnostic and care capacities, as well as capacity for monitoring and evaluation, including of potential drug resistance (e.g. AMR).

Similarly, mainstreaming NTDs in training and capacity strengthening initiatives of (public and private) health workforce will greatly contribute to building national implementation capacities for NTDs.

National initiatives in health finance and governance can greatly contribute to achieving UHC without financial hardship, increasing the implementation capacity for NTDs and lessening the dependence on external donor funding in the long term.

Water, sanitation and hygiene (WASH) are critical in the prevention and

management of all the NTDs. In 2015, WHO has launched a global strategy to strengthen efforts on water, sanitation and hygiene to accelerate progress against NTDs.<sup>63</sup> This strategy calls for closer coordination of WASH and NTD programs, through joint planning, delivery and evaluation of programs, strengthening of evidence, and making better use of endemicity data to target WASH services to the most vulnerable, underserved populations. Inversely, adding a (modest) NTD implementation component – including vector containment and control – to much more substantial investments in water and sanitation infrastructure is a cost-effective way to expand NTD interventions. Many WASH and NTD actors have started to work together on planning and implementation and have started to document their experiences and lessons learnt.<sup>64</sup>

## 3.2 Strategic assets that can help in policy-making

### 3.2.1 Poverty focus

NTDs are intimately related to poverty and keep on anchoring affected people in poverty because of their impact on education, performance, productivity and earning a livelihood, as well as de facto out-of-the-pocket expenses that are related to their treatment and care in most health systems in the developing world.<sup>65,66</sup> Wide access to NTD interventions – free of charge to the end user – have a clear potential to break this vicious cycle and contribute to poverty reduction. In the long term NTD interventions could therefore contribute to a livelihood approach to poverty and migration. A good example of such improvements in both health and wealth are provided by the im-

pact of river blindness control in Africa.<sup>67</sup> Not only do people not become blind or suffer from severe skin disease anymore, but they have been able to return to cultivate the best fertile land near rivers they had left because of fear of infection with the parasitic disease. River blindness investments have thus made 25 million hectares of arable land safe to cultivate, with the potential to feed 17 million people.

### 3.2.2 Investment case and efficient spending

NTD interventions are known to be some of the most cost-effective public health interventions, not only in the short term with regard to avoid-

ance of suffering and disability,<sup>68</sup> but also in terms of return on investment in the long term, both for individual diseases<sup>69,70,71</sup> as for NTDs as a whole.<sup>72,73</sup> The level of cost-effectiveness of NTD interventions is driven, among other factors, by the commitment of pharmaceutical companies to provide free medicines, the number of people affected and scale of potential health and socio-economic benefits, the opportunities for economies of scale by integrating and synergizing delivery modes, and the substantial volunteer contributions by communities and teachers.<sup>74</sup> These economic effects are most likely an underestimation of the actual gain from NTD-interventions, because they do not include wider social effects of infections (e.g. productivity effect).

### 3.2.3 A vast and diversified international partner network, including the private sector, that is highly committed

Drawing inspiration from the World Health Organization (WHO) “NTD Roadmap for Implementation”<sup>76</sup>, which outlines bold targets for the control, elimination or eradication of NTDs by 2020, leaders of several prominent global health and development organizations, together with industry partners, met in London in 2012 and pledged to unite in their efforts to support the achievement of the WHO 2020 goals in respect to 10 neglected tropical diseases. These collective promises of support were formalized into the London Declaration on NTDs,<sup>77</sup> and it is around this declaration that a broad coalition of partners has emerged. This coalition of NTD partners, called *Uniting to Combat NTDs*,<sup>78</sup> is composed of bilateral and multilateral donors, the private sector, philanthropic foundations, endemic countries, NGOs, and academia. These partners have been working alongside WHO and national programs to address the neglected disease burden in some of the world’s hardest to reach areas, tracking their progress towards the 2020 goals annually. The NTD index by Uniting to Combat provides an overview of a country’s progress in reaching people in need of NTD treatment.<sup>79</sup>

This alliance can also provide collaborative links with a vast network of very diverse international partners, and opportunities to leverage investments by individual donors or donor agencies, not only in taking field implementation to scale, but also to support multilateral research, translating research findings into practice, and swiftly introducing novel products into implementation.

#### Box 4

#### Key Messages from: An Investment Case for Ending Neglected Tropical Diseases:<sup>75</sup>

- Neglected tropical diseases (NTDs) together account for a significant and inequitably distributed global disease burden, similar in order of magnitude to those of tuberculosis or malaria at approximately 22 million disability-adjusted life-years (DALYs) in 2012
- Cost-effective interventions to end NTDs are available for as little as US\$3 per DALY averted; these interventions reach the poorest and most marginalized populations and provide an integrated approach to treat multiple diseases
- Ambitious eradication, elimination, and control targets for individual diseases emerged with the launch of the World Health Organization’s NTD roadmap in 2012; the Sustainable Development Goals target “the end of NTDs” by 2030
- Interventions to end NTDs are affordable globally; estimated treatment costs are US\$750 million per year for 2015 to 2020 and US\$300 million per year for 2020 to 2030
- Interventions to end NTDs are affordable for the governments of most endemic countries
- Treatment and vector control combined require less than 0.1 percent of domestic health spending. Domestic value for money is enhanced by the unprecedented scale of the London Declaration donation of medicines for nine of the most prevalent NTDs
- Reaching those targets could avert an estimated 519 million DALYs from 2015 to 2030, compared to 1990 and the beginning of concerted efforts to control NTDs
- The benefit to affected individuals in terms of averted out-of-pocket health expenditures and lost productivity exceeds US\$342 billion over the same period
- The net benefit to affected individuals is about US\$25 for every dollar to be invested by public and philanthropic funders between 1990 and 2030—a 30 percent annualized rate of return
- The end of NTDs represents a fair and efficient transfer toward universal health coverage and social protection for those who are least well-off

The strict accountability approach in terms of monitoring progress has led the African Leaders Malaria Alliance (ALMA) to add neglected tropical diseases to its annual scorecard on disease progress at the 30th African Un-

ion summit in January 2018. By doing so, African leaders are making a public commitment to hold themselves accountable for progress on NTDs, as the ALMA scorecard is personally reviewed by African heads of state

Table 5: Drug donation overview by disease in 2017

Disease	Drug	Form	Company	Shipped treatments
Lymphatic Filariasis	DEC	Tablet	Esai	143.587.200
	Albendazole	Tablet	GSK	770.419.000
	Ivermectin	Tablet	MSD	113.441.437
Trachoma	Azithromycin	Tablet	Pfizer	81.381.274
Soil-transmitted helminths	Albendazole	Tablet	GSK	123.690.000
	Mebendazole	Tablet	J & J	29.200.800
Onchocerciasis	Ivermectin	Tablet	MSD	97.324.187
	Ivermectin	Tablet	MSD	89.210.080
Schistosomiasis	Praziquantel	Tablet	Merck	60.343.200
Leprosy	PB/MB	Tablets and Blister packs	Novartis	2.242.428
Visceral Leishmaniasis	AmBisome	Vials	Gilead	62.600
Chagas	Nifurtimox	Tablets and Blister packs	Bayer	1.500.000
Human African trypanosomiasis	Nifurtimox	Tablets	Bayer	300.000
	Eflornithine	Tablets	Sanofi	3.200
	Pentamidine	Tablets	Sanofi	1.130

\* Represent number of tablets/vials shipped.

Note: Total tablet donations amount to almost 1,7 billion tablets (representing c. 1.5 billion treatments).  
Source: 2017 drug donation data overview, Uniting to combat NTDs.

every year, putting NTDs alongside malaria and maternal and child health as top health priorities for the continent. Moreover, there are discussions to also institute a nutritional scorecard for Africa which should also entail an NTD-component.

### 3.2.4 NTDs as an opportunity to make poor people fully benefit from Universal Health Coverage and integrated development

NTDs are not an isolated group of diseases and it is wrong to think that

they merely require a stand-alone, vertical approach. There are many links (co-morbidities) with other priority public health areas such as non-communicable diseases (NCDs), female reproductive health, mental health and others. Moreover, most of the NTD consequences that become visible in other health areas – such as female infertility, chronic anemia and increased HIV transmission, high incidence of late-onset epilepsy, liver and kidney disease due to schistosomiasis or chronic heart disease due to Chagas disease - are preventable by large scale action against NTDs starting early in life. Therefore, NTDs should become an integral part of the UHC essential benefit package especially

in poor communities. High occurrence of NTD co-morbidities in such communities should trigger the search and preventive action for NTDs, both in terms of preventive treatment and care as well as fundamentally preventive interventions in other sectors. Only in this way will countries be able to strengthen their health services according to local priorities, tailor their UHC package to the needs of their poorest communities, and direct development to where it is most urgently needed and will yield the highest impact.

# OVERLAP OF NTD-PROGRAMS AND SELECTED PROJECTS FUNDED BY GERMANY

The previous section outlined several 'assets' that have been established in the fight against neglected tropical diseases (NTDs), i.e. physical infrastructure as well as processes, platforms, and characteristics (such as co-morbidities). This section is about bringing these findings together with selected projects from within the pool of ongoing projects of the German development cooperation. For that purpose, we searched the databases provided by the German Ministry for

Economic Cooperation and Development (BMZ), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, and KfW Development Bank for projects that would provide illustrative examples of the overlap of assets of NTD and the respective projects. We are aware that integrating NTDs ex-post - that is after the project design - into ongoing projects is unlikely in most cases. Nevertheless, we believe that there is high value in providing evidence that – at least on

paper – integrated projects are feasible and make sense.

The following examples cover three different areas: health, WASH, and nutrition. All three areas are priorities of the German development policy. Identification criteria were (1) epidemiological overlap, (2) financial volume of project, and (3) goal overlap with NTD-agenda.

## 4.1 Co-morbidity between HIV and schistosomiasis

The connection between neglected tropical diseases and the HIV epidemic have so far received only limited attention. Given recent research on Female Genital Schistosomiasis (FGS), this situation has started to change.

### 4.1.1 Case Study: Zambia and Germany's support for HIV/AIDS-programs

Germany spends significant amounts on the fight against HIV/AIDS and Malaria in sub-Sahara Africa. Given the co-morbidity issue seen above,

exploring potential overlaps of an integrated approach to fighting HIV/AIDS and NTDs at the same time might prove very fruitful. For Zambia, a modelling study evaluating the potential effect of mass drug administration for HIV prevention in communities with high endemicity of Schistosomiasis estimated that targeted annual treatment of school-age children could reduce HIV prevalence by six percent after the first 20 years of intervention and HIV incidence by 9 percent.<sup>80</sup> Of course, studies that identify schistosomiasis as a risk factor for HIV, emphasise that while preventive

drug treatment is essential, access to safe water sources is as important to address the disease.<sup>81</sup> Nevertheless, we take these concrete figures as starting point to analyse Germany's development cooperation with Zambia.

1.2 Million Zambians live with HIV – in a country with a population of about 16 million.<sup>82</sup> Figure 5 shows the prevalence of HIV by province in Zambia. While Zambia has made progress in fighting HIV over the past ten years, the country still has one of the highest incidence rates in the world. In 2016, estimates stated that about

59,000 people were newly infected with the virus (down from 69,000 in 2005). Among the newly infected in 2016 were about 8900 children.<sup>83</sup> The National Health Strategy 2017-2020 specifies the goal to cut the percentage of new infections by almost half (from 0.7 percent in 2016 to 0.4 percent in 2021).<sup>84</sup>

Schistosomiasis is endemic in all but two districts of Zambia,<sup>85</sup> but endemicity is not equally high across the country as figure 6 shows. In the WHO Country Cooperation Strategy 2017-2021, the country outlined the fight against schistosomiasis, soil transmitted helminthiases, and other NTDs as a focus area of national health policy. The national health target is to reduce the prevalence of schistosomiasis to 22.7 percent by 2020.<sup>86</sup> Nationwide, almost two million people are infected with schistosomiasis,<sup>87</sup> but only every third person who requires treatment against schistosomiasis received treatment in 2016.<sup>88</sup> The National Health Strategy 2017-2020 indicated that by 2021 none of the 105 districts should be endemic for schistosomiasis, STH or lymphatic filariasis anymore. For that purpose, the Ministry of Health plans to prophylactically treat each year between 1.6 and 2.6 million people against schistosomiasis – reaching a 100 percent coverage rate by 2017.<sup>89</sup> The Zambian Ministry of Health also outlines several challenges with regards to this target ranging from inadequate coordination in management of the NTD program at the national level, lack of trained persons at the district level, inadequate capacity for the distribution of drugs. Strategic interventions include the integration of NTD control activities into primary health care services, the scaling up of MDA campaigns for NTDs that can be fought with preventive chemotherapy or the formulation of health (sanitation and hygiene) promotion programs that are aimed at preventing and reducing NTDs.<sup>90</sup>

Figure 5: HIV prevalence in Zambia by province (in %)

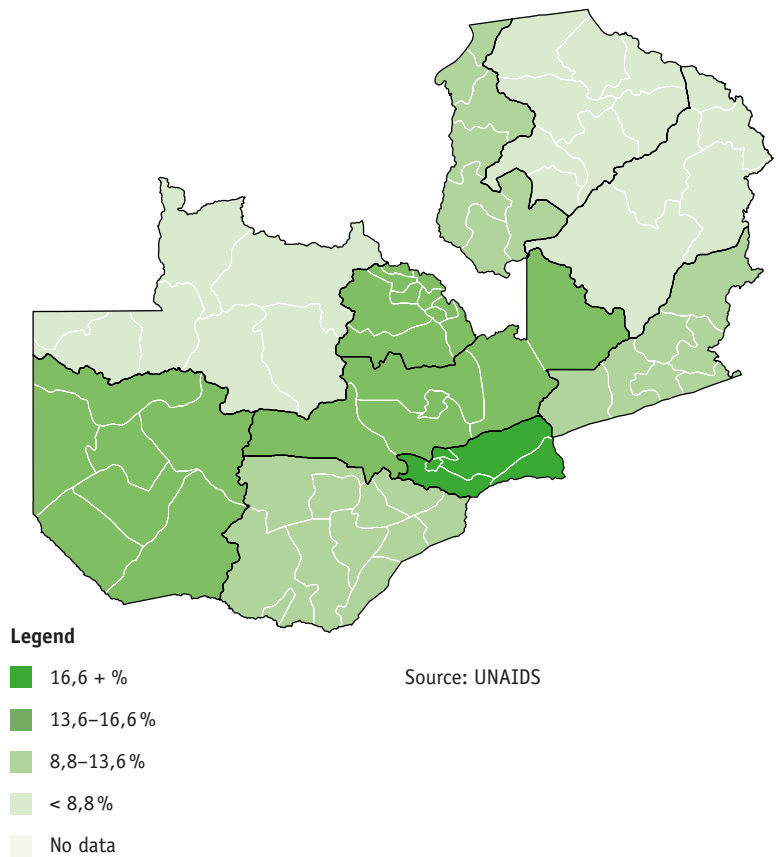
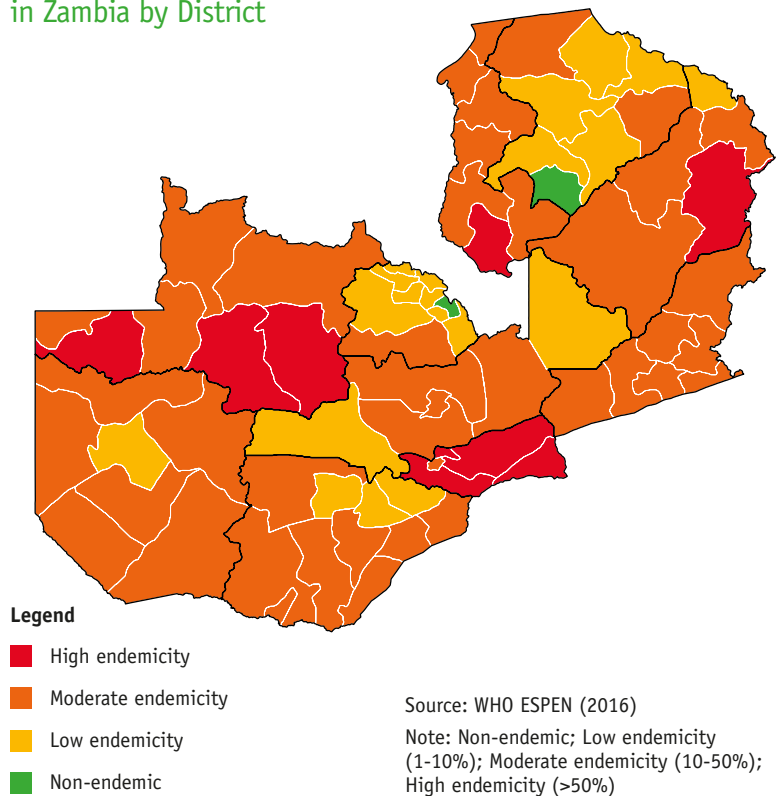


Figure 6: Endemicity status of schistosomiasis in Zambia by District





### 4.1.2 Germany's support for HIV/AIDS programs in Zambia & potential for NTD-fight

The German Development Ministry has significantly supported health-related programs in Zambia. Between 2013 and 2015, an average of about US\$ 1.1 million in bilateral development assistance for health were disbursed annually to projects in the country. One major project is the Zambian-German Multi-sectoral HIV Program which has been running from 2012 until today; the entire project funding commitment amounts to more than four million euro. The project focusses on raising awareness and spreading knowledge about the risks of HIV among schoolboys and schoolgirls aged between 10 and 19 in two districts of the Southern Province.\* The approach of GIZ – the implementing organization for the project – is to work closely with civil society organizations in the region, train facilitators and peer educators on the topic, and assisting schools to ultimately increase HIV-prevention.<sup>91</sup> As a result, the workshops will reach more than 20,000 participants, the 'District AIDS Task Force', and the quality of the work of the 'District AIDS Coordinators' will have improved.

The logic of the project mentioned above is to work through schools and multipliers to improve HIV prevention by engaging young people events targeted to them. This aspect about the project offers a productive link to address the co-morbidity situation between female genital schistosomiasis and HIV. School girls treated early on with praziquantel would less likely develop female genital schistosomiasis. Women who have been treated against schistosomiasis with praziquantel at least once in their life, have developed 50 percent less FGS later on in life.<sup>92</sup> Given the endemicity

status in most districts of the Southern Province, i.e. 10-50 percent, WHO recommended interventions involve treatment of all school-age children (enrolled and not enrolled) once every two years with praziquantel and the treatment of adults considered to be at special risk (e.g. pregnant and lactating women; groups with occupations involving contact with infested water, such as fishermen, farmers, irrigation workers, or women in their domestic tasks).<sup>93</sup> Usually, preventive mass treatment with praziquantel is done through 'vaccination'-days at school. The BMZ-funded project could potentially be able to build on the created network of facilitators and peer educators to support local initiatives against schistosomiasis. Capacity being built through GIZ can potentially be used for the expansion of preventive NTD-measures. German support for a coordinated approach could go through the Expanded Special Project for Elimination of Neglected Tropical Diseases (ESPEN) and support of NTD-related efforts at the national level.

There is existing engagement from international actors with regards to NTDs in Zambia. However, with regards to schistosomiasis only DFID has directly supported a large-scale drug administration program.<sup>94</sup> As part of the "Integrated Control of Schistosomiasis and Intestinal Helminths in sub-Saharan Africa"-program, DFID aims at reducing morbidity and mortality by supporting ten countries in delivering 203.5 million treatments against the diseases. The project included a country-wide mapping of the disease as well as the procurement, and drug delivery.<sup>95</sup> In 2015, the program conducted the first round of preventive treatment among school-aged children against the disease.<sup>96</sup> Aside from this project, the END Fund supported Zambia with more than US\$ 1.3 million between 2012 and 2016 addressing lymphatic filariasis and trachoma.<sup>97</sup>

### 4.1.3 Potential for cross-sector linkages

Aside from the aforementioned HIV-program, Germany supports many other programs in Zambia. In total, Germany's commitment to Zambia through bilateral projects amounts to ca. 267 million euro (some KfW projects last as long as 2026), plus funds through the initiative One World without Hunger (SEWOH).<sup>98</sup> The major areas for cooperation are water and sanitation as well as 'good governance' (e.g. decentralization, fiscal governance).

It is particularly in the projects for a better water and sanitation-situation where we can see further possibilities to fight schistosomiasis and NTDs more generally. And no other player has really addressed this issue. Cross sector linkages are increasingly recognized by the major DFID-project, but have not yet materialized.\*\* Via the German Development Bank, KfW, the second phase of an investment program to improve water sources and sanitation in rural areas in Zambia will implement a financing mechanism that will help up to 47 districts in five provinces to finance WASH-initiatives.<sup>99</sup> Moreover, the technical cooperation – via GIZ – supports water regulation institution (NWASCO) and the water utilities companies in developing communication programs for the topics of HIV and gender equality. It is in such initiatives where cross-sectorial potential lies for an integrated fight against schistosomiasis and NTD co-morbidity.

\* Planned End Date of the project: 31.12.2018; budget: 3 million euro --- IATI – Database. U.a. <https://www.giz.de/de/weltweit/32840.html>

\*\* The 2017 evaluation report states: "SCI [Schistosomiasis Control Initiative at Imperial College London] recognises that if targets for the interruption of transmission are to be achieved, there is a need to incorporate behaviour change messaging for reducing the risk of exposure to SCH and the STH and, where feasible, to coordinate with WASH sector partners."

## 4.2 WASH and NTD-projects

### 4.2.1 The case for integration of WASH and NTD programs

Contamination of drinking-water and bodies of water and soil as well as inadequate hand-washing facilities and practices are estimated to have caused 871,000 deaths globally in 2012 – most of them from infectious diseases.<sup>100</sup> About 45 percent of these deaths occurred in the WHO African Region.<sup>100</sup> Despite progress made in past decades, many of the ‘improved water sources’ are still insufficient in that they contain faecal contamination.<sup>102</sup>

Water is important for NTDs in four major ways: First, water contaminated with faeces and urine (from humans or animals) can contain worm eggs that contaminate surface water and lead to transmission of schistosomiasis, soil-transmitted helminthiasis and (neuro)cysticercosis. Second, poorly constructed latrines give breeding places to *Culex* mosquitoes that are,

among other things, also efficient vectors of lymphatic filariasis. Third, even uncontaminated, but insufficiently protected water containers represent larval habitats for *Ae. Aegypti* and *Ae. Albopictus* mosquitoes which transmit dengue, Zika, yellow fever, and chikungunya viruses to humans. Fourth, clean water is essential for the treatment of some NTDs such as Trachoma – which is a major cause of preventable blindness. Trachoma is caused by a bacterial infection transmitted through contact with eye-seeking flies, dirty fingers and fomites.<sup>103</sup>

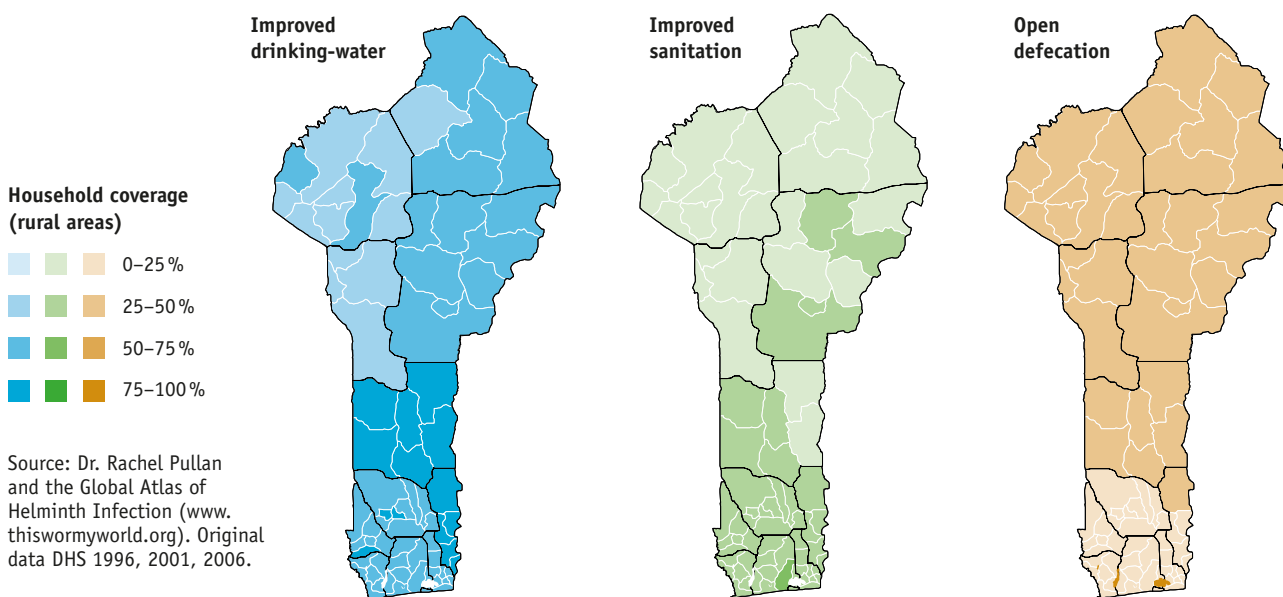
Three examples illustrate how WASH-interventions can support the fight against neglected tropical diseases: First, access to adequate sanitation is associated with significantly lower odds of infection with schistosomiasis.<sup>104</sup> Second, trachoma among children has been shown to be less likely to develop if these children had better hygiene. And active trachoma is less likely when there is an access to sanitation.<sup>105</sup> Third, people who

wash their hands after defecating are less than half as likely to be infected with soil-transmitted helminths as those who did not.<sup>106</sup>

NTD-interventions also support WASH-interventions in a meaningful way: People requiring interventions against NTDs are in their majority poor and marginalized. Monitoring NTDs and intervention coverage is therefore key to ensuring that the least well off are prioritized in efforts towards UHC and universal access to safe water and sanitation.<sup>107</sup> Indeed, NTD monitoring can help the health and WASH sectors to achieve their universal access goals by better targeting the poorest and most marginalized populations.<sup>108</sup>

This pro-poor focus of NTD-interventions also relate to rural development. Comprehensive investments into piped water and traditional sanitations (including their installation and maintenance) are often beyond the financial means of areas with high NTD endemicity. WASH-interventions can make a sig-

Figure 7: WASH indicators in Benin by Communes



nificant impact by point of use treatment of water (WA), construction of latrines (S), and health education and behavioural modification (H) which aims at discouraging open defecation within a community-led approach.<sup>109</sup>

### 4.2.2 Case Study: Benin's WASH and NTD situation

In Benin – a country with a population of 11 million people – hygiene standards are still fairly low (3 out of 4 people have no hygiene facility), sanitation facilities or the adoption of such facilities is still limited (more than 2 out of 4 people practice open defecation), and drinking water often comes from surface water or unimproved sources (more than 1 out of three people).<sup>110</sup> All three indicators point toward a problematic environment that makes transmission of neglected tropical diseases more likely.

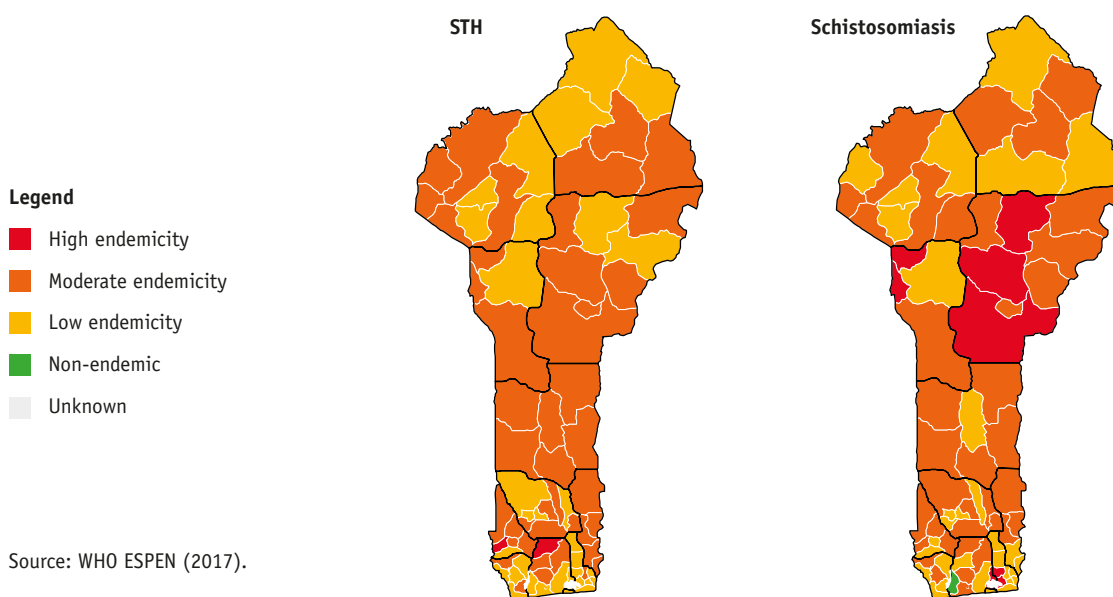
The maps in figure 7 shows these indicators for Benin on a sub-regional level.

el. What becomes clear is that open defecation is practiced particularly in rural areas (but in all districts of the countries it is higher than 50 percent). Improved sanitation is particularly weak in northern and some western and eastern communes. The situation is better with regards to improved drinking-water sources. Nevertheless, the western communes as well as the north lag behind.<sup>111</sup>

Despite significant progress on covering more people with treatment against NTDs in Benin, there are still 1.9 million people who did not receive treatment but would have required it. For example, schistosomiasis is endemic in almost all 77 communes (districts) of the country (see figure 8). Estimates go as far as suggesting almost 30,000 cases of schistosomiasis per 100,000 people living in Benin; Malaria prevalence is estimated to be at 20,000 per 100,000 people. Soil-transmitted helminthiasis are suspected endemic in all communes with an estimated average prevalence of 15.8 percent nation-wide.

In 2015, the health ministry of Benin published an NTD Master Plan (2016-2020) in coordination with the Special Project for Elimination of NTDs (ESPEN). The document represents the latest comprehensive plan to address different NTDs and it highlights the strong need for cooperation among the different ministries.<sup>112</sup> For three of the NTDs for which WASH-interventions are key, the government outlined ambitious reduction goals: It aims to reduce the prevalence of lymphatic filariasis to less than 1 percent in the 50 endemic communes, to reduce the prevalence of schistosomiasis to less than 10 percent among 75 percent of school-aged children, and to reduce the prevalence of intestinal parasites to less than 20 percent in 75 percent of school-aged children by 2020.<sup>113</sup>

Figure 8: Endemicity status for STH (left) and schistosomiasis (right), in Benin 2017



### 4.2.3 Benin-Germany development cooperation on WASH and NTD-potential

Projects to improve people's access to safe drinking water and clean sanitation facilities, and to increase hygiene standards are a major focus of German development projects in sub-Saharan Africa. Taken together, the financial commitment of all projects currently in the implementation phase in sub-Saharan Africa amounts to ca. 983 million euro.<sup>\*\*\*</sup> The German Water Strategy of the BMZ outlines as one of four targets to "ensure access to sanitary facilities and water supply as well as hygiene".<sup>117</sup> One relevant global initiative – "Sanitation for Millions" – aims to reach four million people and improve WASH-infrastructure in at least 500 health facilities and 1000 schools. The strategy document emphasises that investments into a better water and sanitary infrastructure must go hand in hand with a change in behaviour which requires also investments into (health & hygiene) education.

In its bilateral cooperation with Benin, Germany has a long-standing tradition of supporting water-related projects. The KfW Development Bank has started a major project to improve rural water supply in 1998 with investments into building wells, small-scale distribution networks, pumps, and latrines in schools.<sup>118</sup> Currently, Germany supports development projects with a combined financial commitment of almost 225 million euro. With 47.4 million euros, the three projects related to drinking water, sanitation, and hygiene represent more than 20 percent of those commitments.

One of the projects – funded through KfW and implemented with the National Water Society Benin (SONEB) – aims at improving the water supply in the peri-urban area around Abomey-Calavi (in the very south of

#### Box 5

### Benin, the USAID-financed NTD-Project "Envision" and WASH

USAID is one of the most important partners in the fight against NTDs. The agency has been active in expanding treatment programs for all so-called preventive chemotherapy diseases.\* As part of the global project 'Envision', led by RTI International\*\*, Benin's National Communicable Disease Control Program has been supported since 2013 with financial and technical support. Morbidity management as well as disability prevention has not been on the agenda of the international partners.<sup>114</sup> The focus of the NTD program was so far on mapping disease prevalence as well as scaling-up preventive treatment and diagnosis. The only points where WASH-components were explicitly included were in Trachoma projects and to a lesser extent in some school-based STH-projects.<sup>115</sup> In April 2018, the next phase of support for countries that wish to control and/or eliminate NTDs will start. The project "Control and Elimination of Neglected Tropical Diseases (CEP-NTD)" will have a volume of USD 500 million for the next five years and Benin will be part here, too.<sup>116</sup>

the country). In total, an additional 250,000 people in the areas are to be connected to adequate drinking water.<sup>119</sup>

Another project is implemented by GIZ and is a follow-up to previous projects in Benin. As part of the German technical cooperation, the German government – through GIZ – has supported local and regional authorities in providing safe drinking water and in improving sanitary facilities with a total commitment of over 48 million euros since the year 2004.<sup>120</sup> The project on 'integrated management of water resources and water supply aimed at supporting local authorities in designing detailed action plans on hygiene, sanitation and drinking water, in building partnerships between different actors, and in coordinating a draft for a national strategy on WASH in peri-urban areas.<sup>121</sup> Geographically, the project worked with the six Départements Mono, Couffo, Ouémé, Plateau,

Atacora, and Donga – including the 38 communes of those departments which are home to 4.2 million people.

Health-related goals have always been part of the GIZ- and KfW-led projects. The emphasis has been mostly on institutional aspects, e.g. support the Ministry of Health in Benin in piloting easy-to-use 'self-tests' for drinking water quality in order to trigger a change in consumer behaviour. Never-

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\* Lymphatic Filariasis, Onchocerciasis, schistosomiasis, STH, and Trachoma.

\*\* In partnership with CBM International, The Carter Center, Fred Hollows Foundation, Hellen Keller International, IMA World Health, Light for the World, Sightsavers, and World Vision.

\*\*\* Included are all bilateral and regional projects with CRS-codes 140 currently in implementation in sub-Saharan Africa as provided by the BMZ's IATI-database (last retrieved on the 06.10.2018). Due to regional projects that might also include some countries in Northern Africa, slight overestimations are possible.

theless, the cooperation has focused mostly on actors other than the Ministry of Health, namely the Centre de Formation aux Métiers de l'Eau and the SONEB (Société Nationale des Eaux du Bénin) to set up technical learning platforms, to improve curriculums and to devise training methodologies that would cover both the provision of sanitation and drinking water.<sup>122</sup>

Traditionally, these goals are not the essential part of projects combating NTDs which would put a greater emphasis on hygiene and sanitation within communities. Nevertheless, there is a productive potential in the two project approaches. First, as NTD projects have a deliberate focus on community-based programs (incl. a regular and annual contact, see section 3.1.1.2), they represent also a positive platform for training programs in WASH. The network that the

water projects supported by Germany built in different districts represents an opportunity to link health programs with a wider institutional base. Second, there is considerable geographical overlap between the GIZ project in the Départements Plateau, Atacora, and Donga where both STH and schistosomiasis are prevalent and mass drug administration has been conducted through the USAID-funded project ENVISION. Thirdly, the expertise of KfW and GIZ with the water-related institutions and organizations in Benin is a tremendous asset for the integration of NTD-WASH interventions. This expertise is strongly needed in the NTD-community. Moreover, the project does not only focus on strengthening management capabilities, but by expanding WASH-infrastructure in peri-urban areas (see the KfW-project above), the project comes very close to the population

very much at risk of getting infected by NTDs.

To support schistosomiasis control in Benin, further projects (or project modules) would have to integrate elements that would raise the awareness for schistosomiasis and its transmission. The geographical overlap between the areas with highest risk of schistosomiasis and the project activities of the German development cooperation represents a good starting point for integration. Integration with existing projects to combat NTDs would be necessary to avoid duplication, i.e. a collaboration with the partners of the ENVISION program to optimize investments in those areas with highest NTD infection risk (identified by regular mapping through NTD-programs).

## 4.3 Nutrition and NTD-projects

### 4.3.1 The case for integration of food and NTD programs

Ending all forms of hunger and malnutrition by 2030 (SDG 2) requires to ensure access to sufficient and nutritious food throughout the year. Resilience of communities against catastrophic weather events, impacts of climate change, and conflicts is a key element of most food programs of development partners.

NTDs affect the nutritional status of people through two channels. Parasitic diseases such as soil-transmitted helminthiasis compete with the body for nutrients and vitamins. Evidence from numerous studies shows that this competition can adversely affect growth and cognitive development of children,

can endanger women who give birth by causing anaemia during pregnancy and thus increasing the risk of blood loss, and it can reduce the output farmers can get from their animals. Indirectly, NTDs cause lasting and chronic disabilities. Eyesight, concentration or the ability to walk can be compromised. As a result, work productivity of farmers is reduced and stigmatisation and exclusion due to disabilities can affect how people are able to support themselves and their families.

Conversely, some agriculture programs and food security programs have an intrinsic interest to fight NTDs. Estimates say that around 600 million people depend on healthy livestock – predominantly small-scale farmers. Fighting zoonotic diseases – transmitted between humans to animals – such as cysticercosis that can af-

fect livestock could help increase the safety and quality of food and lead to an increased return on investment in food security.<sup>123,124,125</sup>

Strategically, the German government's initiatives 'One World Without Hunger' in 2014 and the G7-declaration for a 'broad development approach for food security and nutrition' in 2015 provide the framework for the country's strong role in working towards SDG2.<sup>126,127</sup> Increasing people's resilience in partner countries is a key element of these initiatives.

A large share of the bilateral projects of Germany focuses on efficient and sustainable land management (e.g. in Ethiopia or Burkina Faso)<sup>128</sup>, resilience of agriculture against the effect of climate change (e.g. in Ethiopia or Madagascar)<sup>129</sup>, and the improvement

of agricultural value chains (e.g. in Togo)<sup>130</sup>. While several of those projects might benefit from an inclusion of NTDs, the largest overlap between the current portfolio of Germany's food/agriculture projects and NTD-projects can be found in initiatives that fight malnutrition and increase productivity of farmers.

### 4.3.2 Case study: Somalia and the fight against malnutrition

Despite significant progress since the past years to stabilize the country,<sup>131</sup> the political and security situation has remained difficult. While the UN-backed government still struggles to exert control beyond the capital Mogadishu and urban towns, the al Qaeda-affiliated Islamist movement al Shabaab still controls many parts of southern Somalia (and remains a hostile force towards aid agencies).

The humanitarian situation of people in Somalia has continued to be dramatic.

Political conflict and natural disasters have caused 870,000 Somalis to flee the country to other countries in the Horn of Africa and to Yemen. An estimated 2.1 million people are displaced within the country itself.<sup>132</sup> Moreover, more than every fourth child under five years suffers from malnutrition (stunting).<sup>133</sup> Together with these developments, the lack of access to clean water and sanitation have created ideal conditions for infectious diseases outbreaks. In 2017, Somalia faced the largest cholera outbreak in the last five years (57,000 cases and 809 cumulative deaths as of 31st of July 2017) and the worst outbreak of measles in four years (c. 15,000 suspected cases as of July 2017).<sup>134</sup> For that reason the Somali government, WHO, and UNICEF recently conducted large vaccination campaigns against measles, that reached children aged 6 months to 10 years.<sup>135</sup>

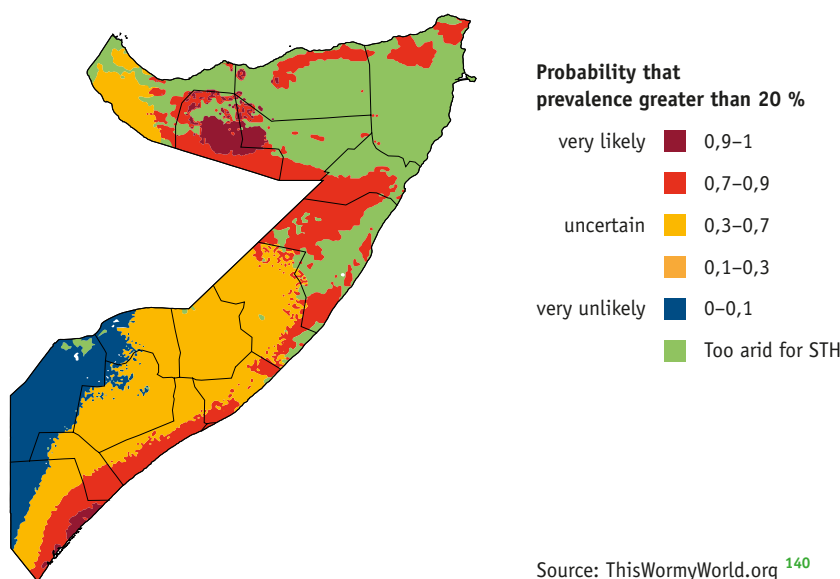
Neglected tropical diseases are a wide spread problem in the country, too. The first systematic mapping of some key diseases was conducted in 2016.

With the support from WHO AFRO and the Bill and Melinda Gates Foundation (BMGF), the geographical distribution and burden of schistosomiasis, soil-transmitted helminthiasis, trachoma, and lymphatic filariasis was assessed.<sup>136</sup> The numbers are significant: In 2016, more than 3.25 million school-aged children and another 1.65 million pre-school children required regular and periodic mass treatment for intestinal worms. More than 300,000 children require treatment for schistosomiasis.<sup>137</sup> Figure 6 displays the predicted distribution of soil-transmitted helminths in Somalia. The colours indicate the probability that prevalence exceeds 20 percent and hence a need for regular treatment.

Given the dramatic threat of malnutrition among children in the next 12 months (projected to be more than 1.2 million children),<sup>138</sup> mass deworming programs and their positive effect on the nutritional status of children represent an important synergy that can be considered in future public health interventions. Among preschool and school-children preventive treatment has repeatedly shown to have positive effects on weight and height among infected children.<sup>139</sup> While the immediate support of people in need might not necessarily focus on parasitic diseases, the future resilience of people to face new crises could be increased by deworming programs.

International action against NTDs in Somalia has been scarce so far. Between 2012 and 2016 the End Fund supported WHO activities in Somalia with a grant of about USD 66,000 directed at fighting schistosomiasis and intestinal worms.<sup>141</sup> With the help of the End Fund, the first mass treatment for schistosomiasis and soil-transmitted helminthiasis was carried out in well-known endemic areas in south-central Somalia.<sup>142</sup> Only in 2017, the WHO provided around 1.8 million

Figure 7: Predicted distribution of soil-transmitted helminths in Somalia (Probability that prevalence exceeds 20%)



treatments with around 900,000 beneficiaries. This would still leave more than four million people in need of treatment.<sup>144</sup>

### 4.3.3 Germany's support for Somalia

Germany's support for Somalia is substantial. The project data provided by BMZ and KfW lists 33 bilateral projects that are currently in their implementation phase.\* The total financial commitment of those projects amounts to almost 269 million euros. Major implementation organizations/channels are the KfW\*\* (51 percent of the financial commitments), GIZ (33 percent), the World Food Program (8 percent). A substantial share of the projects is concerned with food security, nutrition, and health – the categories most important to our study. Three projects will be described in more detail, because of their closeness to the fight against STH. What all three projects have in common is the geographical overlap of the project and STH-prevalence areas. Also, they cover several sectors already, i.e. health and nutrition or nutrition and WASH.

One of the largest projects is a health project related to mother and child health which is implemented by GIZ with a financial volume of 8 million

euros until September 2019. As one main focus, the project provides additional basic health services for pregnant women, mothers and children to improve access to better nutrition, basic hygiene and health prevention. At the same time, it aims at improving the awareness for immunization and trust in public health provision systems by information campaigns. Moreover, in context of the project an electronic data system is piloted to improve the controlling and coordination ability of health institutions. Multisectoral dialogs between the ministries of health, education, and agriculture aim at improving food security.<sup>145</sup>

The project is closely linked with another project which was simultaneously launched. The German Development Bank KfW provides funding worth 23.3 million euro to UNICEF – the implementation partner. The goal is to expand necessary infrastructure, improve medical equipment, and provide health services (e.g. vaccination) in two regions in Puntland (Nugal and Mudug).<sup>146</sup> A key element is the provision of an Essential Package of Health Services to one million people in the two regions including 160,000 children and 250,000 women for three years.

A third exemplary project funded by the German government is implemented by the German Red Cross in

partnership with Somali Red Crescent Society. The project aims at increasing food security and resilience of households in Somalia against external factors with a financial commitment of ca. 1.5 million euro until October 2019.<sup>147</sup> In cooperation with local communities, the implementing organization develops individual community development plans with a focus on livelihood and WASH.

The potential overlap between NTD-programs and the current focus is quite substantial. The infrastructure of vaccination campaigns is very similar to NTD-campaigns (this also includes supply chains, see section 3.1.1.3). Moreover, providing an essential health care package can include deworming medicines at low cost, because the medicines are mostly donated. Additionally, the effect of deworming on the nutritional situation is complementary to the initial project aims. The Germany-funded project in Somaliland sheds light on another potential synergy that can be utilized: The community-based approach with individual development plans provides a substantial opportunity to integrate community-led treatment programs for school-aged children. The community members can support nutritional resilience for their pre-school-aged children through cost-efficient regular treatment.

## 4.4 German support of an NTD-program in the CEMAC-region

End of 2016, the German government committed to support countries in the CEMAC-region (Central African Economic and Monetary Community) in their fight against neglected tropical diseases with ca. 15 million euro over a period of four years. The implementing agency of the CEMAC-region, OCEAC, will work together with the Swiss Trop-

ical and Public Health Institute to help the member countries of the CEMAC to implement their national NTD-programs. The funds are meant to finance mass drug treatment, to improve training in the region, to sponsor local NTD-specialists (ca. 20 PhD students focussing on NTDs),<sup>148</sup> and to support the expert network through events.

\* Based on BMZ IATI-data. Last retrieved on 06.10.2018.

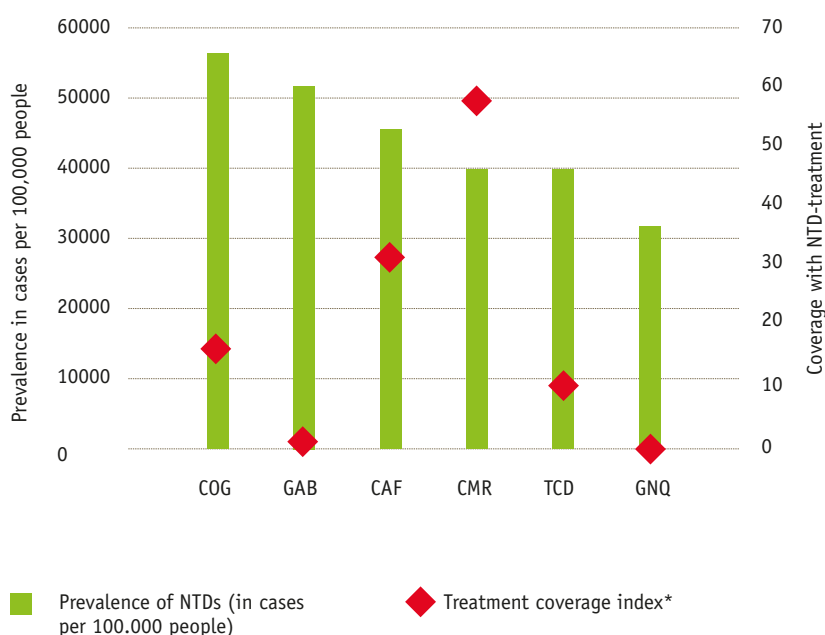
\*\* The KfW is often not the actual implementer. A large share of the funds goes to UNICEF, the World Food Program, the Food and Agricultural Organisation of the United Nations (FAO) or the World Bank.

The countries included are Gabon, Cameroon, the Central African Republic, Chad, the Republic of the Congo, and Equatorial Guinea. All six countries suffer from significant NTD-burdens and mostly lag behind in addressing the diseases that are treatable with donated medicines (see figure 10). Only Cameroon achieved an average treatment coverage for the *preventive chemotherapy* diseases of 60 percent. In Central African Republic only 32 percent of all people who require treatment for one of the six tool-ready diseases received it in 2016. In Chad and the Republic of the Congo, less than one out of five persons requiring treatment received it. Both Gabon and Equatorial Guinea ranked lowest in the NTD mass treatment coverage index – which is an indicator for how much there is still to do in these countries.\*

As part of Germany's special initiative to support health systems in Africa 'Health in Africa', the project supporting the CEMAC-countries represents a first building block of integrating NTDs into a system perspective. From the perspective of the German development cooperation, the countries in the CEMAC-region are long-standing and substantially supported development partners. Currently the BMZ supports 48 bilateral projects with a total financial commitment of almost 420 million euro until the end of 2026. The following example of projects with Cameroon points to further potential for synergies of integrated projects.

For many years, Germany has supported Cameroon in the fight against maternal mortality.<sup>149</sup> In the beginning of 2018, the BMZ committed another 6 million euros until December 2020 to continue the work on providing good quality health services to improve maternal health and strengthen modern family planning.<sup>150</sup> The project's work focuses in this phase on three regions: Adamaoua, East, and South East.

Figure 10: NTD prevalence and treatment coverage in the CEMAC region



Furthermore, GIZ supports the Regional Health Promotion Funds (fonds régionaux de promotion de la santé (FRPS) in the North-region.<sup>151</sup> These funds are nationally recognized for the administration and distribution of medicines, particularly for increasing the availability of modern contraceptives. Moreover, a platform of other technical and financial partners (e.g. World Bank, KfW, AFD) aims to coordinate projects among the development partners.

According to the Master Plan NTDs by the Ministry of Health in Cameroon, 11 NTDs were endemic in the country.<sup>152</sup> Several NTDs are endemic in the regions where the above-mentioned project is actively providing technical support: South-East (STH, onchocerciasis, partially schistosomiasis), East (onchocerciasis, partially schistosomiasis), Adamaoua (onchocerciasis), and North (schistosomiasis).<sup>153</sup> As part of the USAID-funded NTD-program 'Envision', Cameroon has received support to combat all five *preventive chemo-*

*therapy* diseases for seven years. The program is implemented by the Helen Keller Institute (HKI) under the leadership of the Ministry of Health. The project relies heavily on a partner network that includes a wide range of NGOs that have been involved in fighting onchocerciasis since the mid 1990's.

Given this engagement of other international actors in the fight against NTDs and the profile of Germany's engagement, the German development cooperation can contribute to other aspects of the fight against NTDs. The

\* The index is an average of coverage across the diseases endemic in your country that are amenable to mass treatment, calculated using the geometric mean. It is also included into the ALMA Scorecard, African Leaders Malaria Alliance (<http://alma2030.org/scorecards-and-reports/map>) – a set of health indicators personally reviewed by African heads of state every year. It puts NTDs alongside malaria and maternal and child health as top health priorities for the continent.



GIZ-led project described above has developed a wide range of partners in the country – ranging from health education organizations to local faith-based organisations. The kind of long-term engagement offers an opportunity to integrate NTDs with regards to efforts of health systems strengthening which include the improvements of health information systems (DHIS 2), support to national medicine management systems through consultation by the Regional Health Promotion Funds or improvements of the quality management at the district-level with a focus on hygiene in health centres (WASH).\*

There is also potential for cross-sectorial cooperation between different projects of the German-Cameroonian development cooperation. Since 2014, the BMZ has funded a project to support Cameroon's agricultural sector.<sup>154</sup> One element of the project is the setting up of animal health and vaccination stations as a way to reduce mortality rates on local poultry farms. The integration of neglected zoonotic diseases (e.g. rabies, echinococcosis, taeniasis and cysticercosis, and foodborne trematodiasis) that are naturally transmitted from vertebrate animals to humans and vice versa would represent a logical extension to the project.<sup>155</sup> Establishing infrastructure based on the Green Innovation Centres can prove to be highly effective in establishing horizontal structures for the fight against NTDs and at the same time be an element of a One Health-approach.

While these examples referred to Cameroon, Germany has also supported relevant projects in other countries

in the region. In Gabon, for example, the Federal Ministry for Education and Research (BMBF) finances research programs on poverty-related diseases since more than 20 years - mainly via the partnership between Center of Medical Research Lambaréné (CERMEL) and University of Tübingen.

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\* Project to include: Social Franchise (HIV) financed by KfW. <https://www.kfw-entwicklungsbank.de/ipfz/Projektdatenbank%20/Privatsektorvorhaben-Reproduktive-Gesundheit-30443.htm>

# HEALTH SYSTEMS STRENGTHENING, NTDS, AND THE PRIORITIZATION OF THE MOST VULNERABLE

The country case studies mapped out overlaps between the Germany's current engagement in WASH, nutrition as well as HIV/AIDS and the need of those countries to combat NTDS. The main question was: "What are potential synergies between different programs?" This section refocuses on health systems strengthening for UHC

Programs supporting the health system have priority in BMZ's funding strategy over disease-specific programs. Such infrastructure investments include improvements of health facilities, training of health workforce, support of effective supply chains, and improved health financing. In providing those fundamental infrastructures, the programs of the German government contribute to increasing access to essential and quality health services and medicines.

However, despite the disproportionate effect that poverty-related and neglected tropical diseases have on the poorest layers of societies, barely any health systems strengthening program in countries south of the Sahara has been able to incorporate these diseases at a meaningful scale. While health systems strengthening (HSS)-programs can improve the overall situation of the health system, the spe-

cific socio-economic and geographic features of most NTDS imply that progress will likely remain slowest with those diseases. Given the strong commitment of the German government to support particularly SDG 3.8 (UHC), there is a need to tailor health systems strengthening to poverty-related and neglected tropical diseases. In fact, health systems that are not able to deal with diseases hitting predominantly the poorest layers in societies and for which cheap medication is available (often free of cost) can hardly be in the spirit of "leave no one behind". Consequently, a key question to ask is "How can existing health systems strengthening projects of Germany be utilized for the fight against NTDS?" Two important contributions of Germany to the strengthening of health systems in African countries are the expansion of laboratory capacities and the support of (health-related) supply chains.

With regards to laboratory capacities, the outbreak of the Ebola fever virus triggered a renewed effort to better prepare countries for such epidemics/pandemics. The German government has since then put significant financial and political effort behind this priority (see table 5). Similarly, large projects of the Global Fund to

Fight Aids, Tuberculosis and Malaria (GFATM) have sought to improve laboratory capacities (in particular with regards to national/regional reference laboratories). Expanding the efforts to include NTDS would represent a natural next step if this aspect of health systems strengthening is to be 'pro poor'.

A similar argument can be applied for health supply chains. With regards to NTDS, global efforts to synchronize sourcing of the medicaments and transport to national warehouses have largely been successful. A key remaining challenge is the so-called 'last mile'-supply chain. This last mile is of pivotal importance for achieving higher access to health services for remote communities. Germany's support for the Regional Centre of Excellence for Health Supply Chain Management in Rwanda has been started in tandem with a continued support for GAVI and its large-scale vaccination programs. A similar approach could be helpful with regards to NTDS in areas where the need for treatment of people at risk of getting NTDS is highest.

In both cases, the 15-million-euro project to support the CEMAC-countries in their fight against NTDS would provide a natural starting point for

Germany. In the current phase, the project supports financing of medication purchases and operational research to complement the programs. The next step could be to complement these country-led projects with programs to support last-mile drug delivery (maybe in tandem with vaccination programs) and to build laboratory

capacities. By doing so, health systems strengthening efforts would utilize the poverty-tracer aspect of NTDs and ensure that their support prioritizes the most vulnerable.

If such pro-poor approach is further combined with an effort to design multisectoral interventions, one can

truly speak of integrated, equitable development.

Table 6: Examples for health systems projects of Germany and potential relevance for NTDs

HSS-Asset	Examples of projects funded/supported	Opportunity to integrate NTDs
Laboratory capacities	<ul style="list-style-type: none"> <li>■ Reference laboratory and network of mobile laboratories in the East African Community, EAC (10 million euro)</li> <li>■ Regional program in western Africa to improve pandemic preparedness and support the Regional Center for Disease Surveillance and Control ,ECOWAS/RCDC (7 million euro)</li> </ul>	<p><b>Health security &amp; NTDs</b></p> <ul style="list-style-type: none"> <li>■ Explicit encouragement and support of partner countries to include NTD diagnostics in the activities of national/regional reference laboratories.</li> <li>■ Encourage connecting Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM) reference laboratories for NTDs (e.g. finger-prick blood samples).<sup>156</sup></li> </ul>
Health Supply Chain	<ul style="list-style-type: none"> <li>■ Support grant for the Regional Centre of Excellence for Health Supply Chain Management for the East African Community-region (10 million euro)</li> </ul>	<p><b>Health systems &amp; NTDs</b></p> <ul style="list-style-type: none"> <li>■ Expand collaboration beyond GAVI and its related vaccination programs to NTD supply chains, i.e. reaching remote areas for mass treatment during NTD-campaigns.</li> <li>■ Support focus on 'last mile'-supply chains which involves district management teams as well as regional providers (incl. NGOs).<sup>157</sup></li> </ul>

# WAY FORWARD

This working paper outlined operational and strategic assets of the global efforts against neglected tropical diseases. Furthermore, we drew on existing projects of the German development cooperation to illustrate where such assets could be used in the future. From our analysis we wish to point to practical approaches to enhance integration that the development policy community in Germany may wish to pursue, as well as further recommended research.

## **Stewardship for pro-poor health systems strengthening**

The German government made UHC and health systems strengthening priorities of its global health policy. Using NTDs as leverage, Germany can build programs around these priorities that incorporate a systemic approach with established NTD-interventions focussing on the most vulnerable. Multisectoral development projects enable infrastructure investments that are 'not just' created for the purpose of eliminating one disease but establish processes and expertise useful to others (e.g. last mile supply chains for NTDs and food supply chains). International coordination with USAID, DFID, and multilateral organizations that are already supporting specific NTD activities allows Germany to become interface for a more holistic and multi-sectoral SDG approach that eventually will lead to the elimination of most NTDs.

## **Multisectoral project-design**

Germany's development portfolio seems to offer many opportunities to build bridges between the sectors of

agriculture, nutrition, water and sanitation, and health (including NTDs). A deliberate effort is needed to design sound projects that have synchronised goals and result in efficient and effective cross-sectorial projects. We therefore suggest a series of workshops between actors from ministries, implementing agencies, NGOs, pharmaceutical companies, and research institutions that would work out concrete projects. The German NTD-community could actively bring together those actors and ensure a 'pro-poor'-focus.

A few ongoing projects may provide opportunities to retrofit NTD components. The project in the CEMAC region could adopt an integrated approach from the initial stages and constitute a first practical example of such a novel approach.

## **Signals from partner countries**

As most countries in sub-Saharan Africa have an NTD-Masterplan established, incorporating demands from the partner countries for cross-sectorial projects will be helpful to structure future German development cooperation. Involvement of partner countries in the above-mentioned project design in health systems strengthening is key. Once principles are set, the vast international NTD partner network could further amplify the message for it to become mainstream.

## **Project monitoring and operational/implementation research**

Our analysis shows that the conceptual links between health and other

sectors are increasingly well documented. Yet, concrete multisectoral projects are still scarce and even fewer evaluations exist. For that reason, any project that crosses strict sector boundaries should be complemented with rigorous data-driven monitoring and operational/implementation research to fill this gap. Germany's long-standing support for the Special Program for Research and Training in Tropical Diseases (TDR) is an important building block in this regard as well as the German academic institutions.

## **Multilateral platforms**

With the project in the CEMAC-region being closely coordinated with ESPEN, establishing a permanent connection between the program and the policy process in Germany would be beneficial. One option to realize that would be to use Germany's program for secondment of Junior Professional Officers (JPOs) to multilateral organizations – in this case to ESPEN. A further step could be the earmarking of German multilateral support to WHO to support ESPEN. Such a setup would allow Germany a more prominent platform to encourage health systems policies in the region.

# ABBREVIATIONS

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AIDS	Acquired Immune Deficiency Syndrome	NTDSCF	Neglected Tropical Disease Supply Chain Forum
ALMA	Africa Leaders Malaria Alliance	NWASCO	National Water Supply and Sanitation Council, Zambia
AMR	Antimicrobial resistance	OAE	Onchocerciasis-associated epilepsy
BMGF	Bill and Melinda Gates Foundation	PDP	Product development partnership
BMZ	Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung	R&D	Research and development
CEMAC	Central African Economic and Monetary Community	SDGs	Sustainable Development Goals
CEP-NTD	Control and Elimination Program of NTDs	SEWOH	Special initiative 'ONE WORLD – No Hunger'
DALY	Disability Adjusted Life Years	SONEB	Société Nationale des Eaux du Bénin
DFID	UK Department for International Development	SRHR	Sexual and reproductive health and rights
EAC	East African Community	STD	Sexually transmitted disease
EPI	Expanded Program on Immunization	STH	Soil-transmitted helminthiasis
ESPEN	Expanded Special Project for Elimination of Neglected Tropical Disease	STI	Sexually transmitted infection
FGS	Female Genital Schistosomiasis	TB	Tuberculosis
GFATM	Global Fund to Fight AIDS, Tuberculosis and Malaria	UHC	Universal Health Coverage
GIZ	Gesellschaft Internationale Zusammenarbeit GmbH	UNAIDS	Joint United Nations Program on HIV/AIDS
HIV	Human Immunodeficiency Virus	UNICEF	United Nations International Children's Emergency Fund
HPV	Human papillomavirus	VL	Visceral leishmaniasis
JPO	Junior professional officers	WASH	Water, sanitation and hygiene
KfW	KfW Development Bank	WHO	World Health Organization
MTCT	Mother-to-child transmission	YLD	Years lived with disability
MDA	Mass drug administration	YLL	Years of life lost
NCD	Non-communicable diseases		
NGDO	Non-governmental development organization		
NGO	Non-governmental organization		
NID	National Immunization Day		
NTD	Neglected Tropical Disease		

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