

Integrating WASH into NTD Programs: A Desk Review



The WASHplus project supports healthy households and communities by creating and delivering interventions that lead to improvements in access, practices, and health outcomes related to water supply, sanitation, and hygiene (WASH) and indoor air pollution (IAP). This five-year project (2010-2015), funded through USAID's Bureau for Global Health (AID-OAA-A-10-00040) and led by FHI 360 in partnership with CARE and Winrock International, provides program implementation and technical assistance and uses integrated approaches to reduce diarrheal diseases and acute respiratory infections, the two top killers of children under five years of age globally. WASHplus can integrate WASH and IAP activities into existing education, HIV/AIDS, maternal and child health and nutrition programs and builds strong in-country partnerships to increase impact. In addition, WASHplus is charged with promoting innovation in the WASH and IAP sectors.

May 2013

Contact Information

WASHplus Project

1825 Connecticut Avenue, NW

Washington, DC 20009-5721

www.washplus.org

contact@washplus.org

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Integrating WASH into Neglected Tropical Diseases: Experience and Recommendations

Introduction and Background

More than 1 billion people worldwide suffer from one or more painful, debilitating tropical diseases that disproportionately impact poor and rural populations, cause severe sickness and disability, compromise mental and physical development, contribute to childhood malnutrition, reduce school enrollment, and hinder economic productivity. Five of these neglected tropical diseases (NTDs) can be controlled and/or eliminated with four to six years of mass drug administration (MDA). These diseases include lymphatic filariasis (elephantiasis), onchocerciasis (river blindness), schistosomiasis (snail fever), soil-transmitted helminthes (STH)—round worm, whip worm, hook worm—and trachoma.

The USAID NTD program currently has programs to eliminate and/or control NTDs in 24 countries. Although it has been proven that MDAs are key to reducing the spread of disease quickly and cost effectively, the reinfection of these diseases will remain a problem if behaviors and the environment remain unchanged. STH, schistosomiasis, and trachoma are all clearly linked to inadequate sanitation, contaminated food and water, and poor hygiene, providing an opportunity for water, sanitation, and hygiene (WASH) related approaches to help change behavior and the environment. It is unlikely that trachoma can be eliminated without face washing and improved environmental hygiene and the cycle of STH treatment and reinfection will likely persist until sanitation and hygiene practices and conditions are improved.

Objectives of Assignment

USAID's NTD program has engaged WASHplus as a partner in a phased assignment to identify and present WASH interventions to help eliminate and/or control STH, schistosomiasis, and trachoma. Three phases are envisioned. Phase 1 is a desk review that documents the current state of knowledge within WASH and NTD programs and explores any coordinated WASH-NTD integration programs or WASH activities that have been proven or tried to help achieve elimination or control targets. This scan is both global and country in scope. Phase 2 is a joint WASHplus/NTD Department assessment in two to four countries to document country-level WASH and NTD activities in depth and identify promising coordinated approaches and partners. Phase 3 will be to design and implement an integrated activity in one to two countries as the budget allows.

Methods and Country Selection Criteria

The Phase 1 desk review accomplished a quick web scan of WHO, USAID, BMGF, other donor, global NTD initiatives and organizations and published research from 1990 through 2013,

including PubMed for original studies and reviews. The team examined abstracts and full studies and USAID implementing partner websites to identify specific country-level WASH activity information. The team held phone interviews with a range of colleagues involved in WASH and/or NTDs for additional information.

Several criteria were developed to select priority countries for the Phase 1 in-depth review, including, high burden of disease (see Annex 1), geographic distribution, FHI 360 (particularly WASHplus and END) presence, strong potential for different intervention mixes, significant level of current WASH activities, and USAID NTD and WASH engagement. Based on these criteria, the following seven countries were selected jointly by USAID and WASHplus:

- East Africa: Tanzania and Uganda
- West Africa: Ghana, Senegal, and Niger
- Southern Africa: Mozambique
- Asia: Bangladesh

Global Scan of WASH/NTDs

Links between WASH and NTDs were described 100 years ago when the Rockefeller Sanitation Commission defined the challenges associated with hookworm elimination in the United States. The effort highlighted sanitation's role in interrupting STH transmission routes. Europe's elimination of trachoma without using antibiotics further points to the need for comprehensive disease control approaches. The literature is rich with additional acknowledgements of the potential importance of WASH, added to drug-based treatments, to ensure that NTDs are prevented and sustainably eliminated.¹ The 2013 Second WHO Report on NTDs (*Sustaining the drive to overcome the global impact of NTDs*), describes the five public health strategies that form the core to overcoming NTDs. These include:

- 1) Preventive chemotherapy
- 2) Innovative and intensified disease-management
- 3) Vector control and pesticide management
- 4) **Safe drinking water, basic sanitation and hygiene services, and education**
- 5) Veterinary public-health services.

The evidence for the fourth public health strategy is strongest for STH, schistosomiasis, and trachoma. This desk review focuses on these three NTDs.

The following sections describe the magnitude of the problem for each disease, the global strategies that guide their prevention and control, any research or program evidence of WASH and NTD integration in relation to these diseases, global partnerships formed to fight the

¹ WASH: The silent weapon against NTDs. Working together to achieve prevention, control and elimination

diseases, and significant global WASH/NTD coordination events that provide direction for future coordination efforts. The final section is a discussion and analysis of the evidence and recommendations for the countries to choose for the Phase 2 Country Assessments.

Burden of Disease

The seven most prevalent NTDs (ascariasis, hookworm infection, trichuriasis, lymphatic filariasis (LF), onchocerciasis, schistosomiasis, and trachoma) affect over one sixth of the world's population with 90 percent of the disease burden of NTDs in Africa.² This report focuses on five of the seven.³ Each is described below.

Soil-transmitted helminthes infections (STH) are among the most common infections worldwide and affect the poorest and most deprived communities. Worldwide STH contributes to 4,013,000 Disability Adjusted Life Years. According to WHO, more than 1.5 billion people or 24 percent of the world's population are infected with STH. Widely distributed globally in tropical and subtropical areas, most infections occur in sub-Saharan Africa, the Americas, China, and East Asia.⁴ Over 270 million preschool-age children and over 600 million school-age children live in areas where STH is transmitted and need treatment and prevention interventions.

The three most prevalent STH species include: roundworm (ascariasis), whipworm (trichuriasis), and hookworm. Of the three, hookworm accounts for one-third of the disease burden from all NTDs in sub-Saharan Africa.⁵ The disease burden is highest in children. Symptoms include anemia, chronic fatigue, growth stunting; it is these that affect school attendance and future wage earnings. The risk of hookworm infection in pregnant women is well documented and can lead to anemia that can result in low birth weight and increased maternal and child mortality and morbidity. Researchers are hoping to develop a vaccine for hookworm because of high rates of reinfection. Some studies have indicated that STH infections elicit an immune response that leads to greater risk of contracting HIV and increased replication of HIV. In the Hudson Institute's Social and Economic Impact Review on Neglected Tropical Diseases, it is suggested that the total morbidity associated with STH infections rivals that of malaria.

Schistosomiasis is the second largest cause of parasite-related morbidity and mortality worldwide⁶ after soil-transmitted helminthes. Over 90 percent of infections occur in sub-Saharan Africa with the highest prevalence in children, adolescents and young adults.⁷ Transmission has

² What are NTDs? Schistosomiasis Control Initiative from <http://www3.imperial.ac.uk/schisto/whatwedo/whatarentds>

³ See Annex 2: Focus NTDs at a Glance

⁴ WHO Fact Sheet 366. Soil transmitted helminth infections. March 2013.

⁵ Hotez PJ, Kamath A. Neglected Tropical Diseases in sub-Saharan Africa: Review of their prevalence, distribution and disease burden. *Parasit Vectors*. 2009 Sep 24;2(1):44

⁶ Fenwick A, Webster JP, Bosque-Oliva E. et al. The Schistosomiasis Control Initiative (SCI): rationale, development and implementation from 2000-2008. *Parasitology* 2009; 136 (13): 17190-30.

⁷ Hotez PJ, Op. cit.

been documented in 78 countries; 52 countries have targeted their most at-risk population groups for treatment with preventive chemotherapy. At least 243 million people required treatment in 2011; yet only 28.1 million people received treatment.⁸ The global DALY burden is 1,707,000 Disability Adjusted Life Years. The economic and health effects of the disease are considerable. Primary symptoms include abdominal pain, diarrhea, swelling of the liver, fibrosis of the bladder, and vaginal bleeding.⁹ Secondary symptoms can lead to chronic disease and include anemia, inflammation, growth stunting, malnutrition, and overall slowed cognitive development.¹⁰ These chronic diseases can affect people's ability to work and in some cases can result in death. In sub-Saharan Africa, the prevalent schistosomiasis species lead to more than 200,000 deaths per year associated with liver fibrosis and hematemesis. Women with female genital schistosomiasis have a three-fold increased risk of contracting HIV.¹¹ WHO estimates that improved sanitation could reduce schistosomiasis by as much as 77 percent.

Trachoma is the leading cause of blindness and visual impairment worldwide and contributes globally to annual productivity losses of between US\$3 and 6 billion.¹² The global DALY burden is 1.334 million Disability Adjusted Life Years. Worldwide 325 million people currently live at risk for trachoma. More than 21 million have active trachoma; 7.2 million need surgery for trichiasis and 1.2 million have become irreversibly blind.¹³ Trachoma is considered endemic in 53 countries, of which 14 are considered high-burden countries,¹⁴ carrying 80 percent of the burden of active trachoma.¹⁵ Sixty-three percent of all people living in suspected or confirmed endemic areas live in five countries: Egypt, Ethiopia, Mozambique, Nigeria and Pakistan. Lack of clean water and proper sanitation are heavily linked to the prevalence of trachoma. It is estimated that improving sanitation and hygiene (including face washing) can reduce trachoma by 27 percent (WHO). Worldwide, eight countries have reported having achieved their ultimate intervention goals for elimination (Algeria, Ghana, Iran, Libya, Mexico, Morocco, Oman, The Gambia, Vietnam).

Strategies to Eliminate or Control STH, Schistosomiasis, and Trachoma

WHO distinguishes between elimination and control of targeted NTDs. Trachoma is targeted for elimination by 2020, while STH and schistosomiasis are targeted for control. The following practical definitions are described in WHO's January 2012 Roadmap:

⁸ WHO Fact Sheet 115, Schistosomiasis, March 2013.

⁹ Ibid.

¹⁰ Hudson Institute. Social and Economic Impact Review of Neglected Tropical Diseases. Washington DC. November 2012.

¹¹ Kjetland, EF; Ndhlovu, PD; et al. Association between genital schistosomiasis and HIV in rural Zimbabwean women. AIDS. Issue: Volume 20(4), 28 February 2006; 593-600.

¹² ICTC, *The End in Sight: 2020 InSight*, ICTC, July 2011, <http://trachomacoalition.org/node/713>. Part 1, p2.

¹³ Sustaining the drive to overcome the global impact of neglected tropical diseases. Second WHO report on NTDs, WHO 2013.

¹⁴ Burkina Faso, Ethiopia, Sudan, South Sudan, Guinea, Kenya, Mozambique, Niger, Nigeria, Pakistan, Senegal, Tanzania, Uganda, Zambia.

¹⁵ The end in sight, 2020 InSight, International Coalition for Trachoma Control, July 2011.

- Elimination (interruption of transmission) is the reduction to zero of the incidence of infection caused by a specific pathogen in a defined geographical area as the result of deliberate efforts; continued actions to prevent re-establishment of transmission may be required.
- Control is the reduction of disease incidence, prevalence, intensity, morbidity, or mortality, or a combination of these, as a result of deliberate efforts. The term “elimination as a public-health problem” should be used only upon achievement of measurable targets for control set by Member States in relation to a specific disease. Continued intervention measures may be required to maintain this reduction.¹⁶

Safe drinking water, basic sanitation and hygiene services and education are a package of strategies WHO promotes as one of five key public-health strategies to control, eliminate, or eradicate NTDs.

Treatment Modalities

Soil-transmitted Helminthes: STH morbidity can be controlled through regularly administering preventive chemotherapy with antihelminthic medicines (albendazole or mebendazole). Indeed, WHO estimates that about 890 million children require annual treatment with preventive chemotherapy. Although mass drug administration has been possible to date, drugs alone cannot sustainably control the STH burden in 75–100 percent of children by 2020. Children must have access to effective sanitation, sewage disposal and treatment to reduce risk of reinfection and decrease need for continued treatment.

Schistosomiasis: Treatment with praziquantel has been the mainstay of schistosomiasis control since 1984 and has been used for preventive chemotherapy since 2006.¹⁷ The goal of ensuring that at least 75 percent of school-aged children have access to this preventive chemotherapy has yet to be reached. WHO has established targets and milestones for eliminating schistosomiasis toward this goal, i.e., 75 percent national coverage in all countries requiring preventive chemotherapy. WHO states that delivering effective preventive chemotherapy requires hygiene education, improved sanitation, safe drinking water, and snail control.

Trachoma: In 1998, WHO formed the Alliance for the Global Elimination of Blinding Trachoma by 2020 (GET2020) and introduced the **SAFE** strategy. The strategy includes **S**urgery for individuals with trachoma trichiasis; **A**ntibiotics to reduce chlamydial infection; **F**acial cleanliness to reduce the risk of transmission; and **E**nvironmental improvements, including safely managing animal and human excreta, promoting hygienic behaviors to change those that spread disease, and improving access to safe water and sanitation.

¹⁶Sustaining the drive to overcome the global impact of neglected tropical diseases. Second WHO report on NTDs, WHO 2013.

¹⁷ WHO, 2013

A key strategy for all three NTDs is to reduce feces from the environment by promoting an end to open defecation and improving sanitation. Prevention of all three diseases benefits from reduced open defecation. Feces contain STH eggs that get into the soil so worms can continue to infect people who walk in the soil without shoes. Also, hepatic schistosomiasis is transmitted especially when feces runs off into snail-infested waters. Urinary schistosomiasis is transmitted through urine, so preventing urine from entering snail-infested waters is another key prevention activity. Reducing open defecation is greatly beneficial to prevent trachoma since the any latrine seems to prevent flies from seeking feces. Latrine improvements help reduce the fly population.

The following chart outlines the WASH activities that will support disease reduction in the different diseases. Those recognized in WHO/AFRO’s *Guide for Preparing a Master Plan for National NTD Programmes in the African Region*, produced by the NTD Program’s Disease Prevention Cluster, February 2012, are asterisked.

Disease	WASH Activities
Soil-transmitted Helminthes	<ul style="list-style-type: none"> • Sanitation improvement (reducing open defecation) • Food hygiene (washing raw vegetables) • Handwashing • Treated drinking water • Wearing shoes • Social mobilization* • Health promotion* • Operational research*
Schistosomiasis	<ul style="list-style-type: none"> • Sanitation (reducing open defecation and preventing urination and defecation near water bodies) • Stop standing in rivers/lakes (playing, washing clothes, etc.) • Stop drinking river water • Prevention/treatment of breeding sites* • Social mobilization* • Health promotion* • Operational research*
Trachoma	<ul style="list-style-type: none"> • Face washing (several times a day) • Sanitation improvement (reducing open defecation) • Vector control • Water supply improvement* • Social mobilization* • Health promotion* • Operational research*

Integrating WASH and NTD Programming: A Review of the Evidence

WASHplus examined a range of different types of studies and evidence.¹⁸ The meta-analyses provide some evidence that WASH interventions are generally associated with reduced risk of soil-transmitted helminth infection and preventing reinfection. From a recent meta-analysis some associations for hygiene and sanitation were strongly connected with reduced risk of STH infection (see reference #20 below...preliminary findings not yet published). One study from 1990 shows that water and sanitation significantly reduced schistosomiasis. Finally, the evidence for WASH in reducing trachoma is mixed. A Hudson report on cost effectiveness of interventions highlighted that though treatment with drugs can cost pennies, control or elimination can only be achieved through a combination of interrupting transmission through repeated MDA and improving local water and sanitation standards.

Study

Findings/Recommendations

Effect of Sanitation on Soil-Transmitted Helminth Infection: Systematic Review and Meta-Analysis¹⁹

- Sanitation is associated with reduced risk of helminthiases transmission to humans.
- Access to improved sanitation should be prioritized alongside preventive chemotherapy and health education.

STH Meta-Analysis, Taskforce for Global Health²⁰ (not yet published; forthcoming 2013; results for internal use only)

- WASH exposures are generally associated with a reduced risk of infection
- Lower likelihood of STH infection with treated water (boiling, chemical, or other method)
- Piped water use was not associated with reduction in STH infection
- Consistent positive associations with improved sanitation and decreased likelihood of infection
- Wearing shoes was associated with reduced odds of hookworm infection
- Soap use and availability associated with reduced risk of any STH infection
- Washing after defecation was not significantly associated with any STH infection status

¹⁸ Please refer to Annex 3 for an annotated bibliography of some key studies.

¹⁹ Ziegelbauer, K, B Speich, D Mausezahl, R Bos, J Keiser, J Utzinger. Effect of Sanitation on Soil-Transmitted Helminth Infection: Systematic Review and Meta-Analysis. PLoS Medicine, January 2012/Vol 9/Issue 1.

²⁰ Struntz, E, M Freeman, M Stocks, S Ogden and D Addiss. Effect of water, sanitation and hygiene on soil-transmitted helminth infection: a systematic review and meta-analysis, PRELIMINARY, NOT FOR DISTRIBUTION).

Health Benefits from Improvements in Water Supply and Sanitation: Survey and Analysis of the Literature on Selected Diseases, Technical Report No. 55, July 1990, WASH, Washington, DC

- Water supply and sanitation significantly reduced diarrheal diseases, ascariasis, guinea worm, hookworm, schistosomiasis and trachoma.
- Water supply should be as close to the home as possible and WASH programs should emphasize hygiene education to encourage people to use more water for personal and domestic purposes.

A 2012 Cochrane study on trachoma

- No clinical trials existed for implementing the full SAFE strategy. Limited evidence supported the effectiveness of face washing and environmental interventions (the F and E in SAFE) in reducing trachoma.
- Historical epidemiology of the disease supports the view that general improvements in hygiene can have a profound long-term impact on the disease.

Trachoma Meta-Analysis, Taskforce for Global Health (forthcoming 2013)

- Household latrine use decreases trachoma risk by half and face washing alone has similar impact.
- Face washing more than once per day and use of soap are associated with additional impact.
- Although no association was found with water interventions, the metrics are not standard, so comparisons are impossible.
- Face washing and latrine use were not comparable in combination, so unclear whether both together have an added impact.

Program evidence was less conclusive about the health benefits of coordinating WASH and NTD control programs. The quality of programmatic evidence is more difficult to ascertain; therefore it is difficult to prove association. Nevertheless, resounding agreement exists that WASH is important to NTD control and elimination. A recent Health Research Policy and Systems article examining MDA effectiveness in NTD control from research in Uganda concludes that drug demand is low, uptake is uneven, monitoring is inadequate, health education is poor, and critical evaluation of programs is lacking. It goes on to say that a “one size fits all” approach does not work and will not benefit those who need the assistance most.

Programmatic Evidence Linking WASH with NTD Programming

Studies/Programs	Findings/Recommendations
Soil-transmitted Helminthes	
<p>SWASH+ study in Western Kenya</p> <p>School-based sanitation and hygiene improvements on children's reinfection with different STH species</p>	<ul style="list-style-type: none"> Findings were mixed. Deworming alone cannot eliminate STH infection if schools and communities lack adequate WASH facilities. Gains from deworming programs will only be sustained through improved WASH access.
<p>Bangladesh School Health and Nutrition Program²¹</p>	<ul style="list-style-type: none"> Program resulted in lighter worm loads in school children. School and household environment improved with respect to water and sanitation School attendance and completion rates increased.
<p>School-based deworming programs²²</p>	<ul style="list-style-type: none"> Some programs have reduced absenteeism by as much as 25 percent. In Kenya, an evaluation found that one year of schooling was gained for every \$4 invested in school MDA programs. A school-based program in Tanzania that treated children with a single dose of antihelmintic reduced anemia by one-quarter and severe anemia by one-half at the cost of \$1 per child.
Schistosomiasis	
<p>Community-based intervention for preventing schistosomiasis and HIV infections in rural Zimbabwe^{23 24}</p>	<ul style="list-style-type: none"> An integrated package of WASH and preventive chemotherapy and health education reduced schistosomiasis, HIV, diarrheal disease, and bacterial infections in school aged children. An integrated approach was deemed cost-effective.
<p>Schistosomiasis Control in China²⁵</p>	<ul style="list-style-type: none"> MDA alone successfully decreased prevalence rates in the short term. Rates rapidly increased within two years after treatment was discontinued, suggesting that maintaining schistosomiasis control must go beyond MDA and include WASH and snail control.

²¹ WASH: The silent weapon against NTDs

²² Hudson Institute. Social and Economic Impact Review of Neglected Tropical Diseases. Washington DC. November 2012.

²³ Schistosomiasis can cause genital ulcers in women making them more susceptible to HIV infection.

²⁴ Mbah, M, E Kjetland, K Atkins, E Poolman, E Orenstein, L Meyers, J Meyers, J Townsend, A Galvani. Cost-effectiveness of a community-based intervention for reducing transmission of *Schistosoma haematobium* and HIV in Africa.

²⁵ Hudson Institute. Social and Economic Impact Review of Neglected Tropical Diseases. Washington DC. November 2012

Trachoma

PAHO review of SAFE Strategy	<ul style="list-style-type: none">• Results are inconclusive on F and E components of SAFE.• Environmental interventions are crucial to overall health and hygiene of the community.• Scale up all SAFE components.• Conduct additional research to understand the effect and impact of environmental improvements on prevention.
Trachoma Elimination, Morocco ²⁶	Keys to success
Achieved trachoma elimination in record time	<ul style="list-style-type: none">• Government buy-in at all levels• Strong public-private partnerships• Aggressive combination of azithromycin with provision of safe drinking water and improved sanitation for at-risk populations
Achieving Near Trachoma Elimination in Ghana ²⁷	<ul style="list-style-type: none">• Joint task force of all relevant ministries and agencies for planning and budgeting, and government commitment and leadership
	F&E components: <ul style="list-style-type: none">• WASH in schools• Community-led total sanitation (CLTS)• Hygiene promotion/teaching materials• Mandatory community cleaning weekly (one village)
Integrated and Inclusive Community WASH in Mali ²⁸	<ul style="list-style-type: none">• Full SAFE strategy implemented bringing trachoma under control in Tienfala²⁹

The Uniting to Combat NTDs organization has prepared a visual diagram that demonstrates where countries are now with respect to reaching 2020 NTD global goals, where we can get with existing tools and strategies, and where we can get with new tools and strategies. Still, questions exist about whether this applies only to MDA or includes elements of other approaches such as WASH as part of “F” and “E” in trachoma. Adding WASH to NTD control programs is likely the extra push required to meet global goals.

²⁶ Center for Global Development, Case Study 10, from <http://www.cgdev.org/page/case-10-controlling-trachoma-morocco>

²⁷ Sanchez, K. An End in Sight in Ghana’s Trachoma Story. USAID Frontlines, March/April 2013.

²⁸ Ibid.

²⁹ Small town and commune on the Niger River in the Cercle of Koulikoro in the Koulikoro Region of south-western Mali

Stephanie Ogden of the Task Force for Global Health indicated that many trachoma mapping and data collection efforts are ongoing as is other research (see Annex for a list of ongoing studies). Maps are accessible on various partner organization websites, e.g. (www.trachomaatlas.org; www.thiswormyworld.org). DfID is currently funding a large-scale trachoma mapping effort to be completed by 2015. Baseline data are being collected that incorporate questions on WASH characteristics that match the Joint Monitoring Programme (JMP) definitions. These data paired with trachoma prevalence data will be available in a random selection of communities. Policy awareness raising activities are ongoing. WASH indicators were incorporated into the mapping process though it is possible these have been removed since they created much debate and concern.

Global Partnerships and Milestones Related to NTD-WASH Integration

In September 2006 former President Bill Clinton launched the Global Network for Neglected Tropical Diseases—the first global effort to combat NTDs using an integrated framework. Since then the sector has experienced significant growth. Many international players now address NTDs, including donors, governments, private sector pharmaceutical companies, NGOs, coalitions, foundations, and individuals. Although it took time for NTDs to be recognized as health issues that needed global attention, integrating WASH was even slower in being adopted as a critical component to elimination or control. This reluctance to integrate WASH can be explained by several related issues:

- Studies proving the value of adding WASH components to preventive chemotherapy are inconclusive.
- NTD sector funding is insufficient (behind HIV/AIDS, malaria, TB and EPT) to support (or incentivize) WASH collaboration.
- Single-disease/vertical programs are emphasized to reach targets in short time-frames.
- Sectoral stakeholders, constituencies, metrics, approaches, timelines for implementation, and goals are all different.
- WASH and NTD programs in high-burden areas are not coordinated.
- No incentives exist for joint planning, collaboration, implementation or sharing.
- No metrics/indicators exist within the WASH sector to report impact/progress on NTD control, and few, poorly defined metrics/indicators exist within the NTD sectors and disease-specific communities to report progress toward prevention and sustainable control beyond MDA/PCT.

Despite these challenges, the issue of integrating WASH and NTDs has very recently gained traction in international strategies and forums and efforts are starting to take hold. WHO released the Global Roadmap for Implementation toward NTD goals and major stakeholders signed the London Declaration on NTDs to expand support to control and eliminate NTDs. WASH occupies a place of prominence in both the Roadmap and the London Declaration that calls...

“on all endemic countries and the international community... to provide the resources necessary to remove the primary risk factors for NTDs—poverty and exposure—by **ensuring access to clean water and basic sanitation, improved living conditions, vector control, health education**, and stronger health systems in endemic areas.”

The NTD Non-government Development Organization (NGDO) Network Meeting in September 2012 highlighted the importance of integrating water, sanitation, and hygiene into NTD prevention and control programs.³⁰ A two-day roundtable organized by the International Trachoma Initiative, Children Without Worms, The Emory Center for Global Safe Water, and the Bill & Melinda Gates Foundation in December 2012, discussed practical consideration to collaboration between the WASH and NTD sectors. At the recent GET2020 meeting in April 2013, representatives permanently added WASH to the agenda. Participants agreed that improved WASH-NTD sector collaboration is not only possible but essential. The sixth African Union Health Ministers’ Conference also concluded that poor sanitation and limited access to basic health care increases the burden of NTDs on poor communities and called for urgent action.

The illustrative list of organizations below identifies those involved in NTDs and/or WASH for NTD control.³¹

Organization	Objective
Global Network for NTD	Raise awareness, increase political will and funding to control and eliminate seven most common NTDs by 2020
NGDO Network	Share information and approaches on preventing and controlling NTDs
Uniting to Combat NTDs	Accelerate progress in eliminating and controlling NTDs
WHO–Strategic and Technical Advisory Group on NTDs	Coordinate prevention, control, elimination, and eradication of NTDs; published roadmap for implementation
USAID–NTD program	Support interventions in Africa and Asia to eliminate and control NTDs
Global Elimination of Blinding Trachoma by 2020	Implement SAFE strategy advocated by WHO
International Trachoma Initiative	Leverage resources and increase efforts to eliminate blinding trachoma
International Coalition for	Contribute to eliminating blinding trachoma and advocate for implementing the

³⁰ <http://toilettour.org.au/blog/Toilet> blog post.

³¹ Please see Annex 4 for a list of these partnerships.

Trachoma Control	full SAFE strategy
Children Without Worms	Support treatment and prevention of STH infection; reduce re-infection by promoting hygiene practices and increasing access to water and sanitation, via the WASHED framework (water, sanitation, hygiene education, and de-worming)
Schistosomiasis Control Initiative	Assist ministries of health across sub-Saharan Africa to control and eliminate schistosomiasis and STH using praziquantel and albendazole

The fact that WASH-NTD sector integration is being placed on global and country agendas and highlighted as the “big push” necessary to achieve global goals provides new opportunities to promote integration. However, effective interventions will require thoughtful planning and shared metrics that both sectors can own and respect. School-based programs, strengthening the F&E components of SAFE and the role of footwear in protecting against NTDs are gaining increasing attention. Public-private partnerships are providing innovative opportunities to integrate (e.g., IMA World Health and TOMS in Haiti provide shoes to reduce STH; Peace Corps, USAID, and Coca-Cola strengthen WASH training to reduce waterborne diseases).

Integrating WASH and NTDs: Challenges and Opportunities

This desk review clearly indicates that the international community recognizes that drug administration alone is insufficient to break the cycle of disease transmission. Although past programs have largely left out a WASH component, the current renewed interest in securing WASH to any global NTD control or elimination strategy and adding WASH interventions to NTD treatment programs is essential to achieving sustained control and elimination. Further, the growing interest in engaging the WASH sector in NTD programs indicates that now is the time to find effective and cost-effective interventions.

The WASHplus team conducting the desk review reached out to the Taskforce for Global Health and by association Children Without Worms and International Trachoma Institute to explore possible opportunities to collaborate on country assessments and future interventions. The overture was well received and this group of partners is interested in pursuing activities together to the extent possible. They indicated that several countries examined by the desk review were of particular interest, including, Bangladesh, Mozambique, Niger, and Uganda. However, their specific priority interests differ given the different burdens of disease in the various countries. The following table ranks the interest of CWW and ITI.

CWW Country Priorities	ITI Country Priorities
Bangladesh	Niger
Uganda	Tanzania
Tanzania	Mozambique
Mozambique	Uganda
Ghana	Senegal
Niger	
Senegal	

In reviewing the country landscape analysis and seeking criteria with which to recommend countries for Phase 2 analysis, we emphasized the following

- Government commitment to and engagement in the WASH and NTD sectors
- WASHplus presence
- Interest by the Task Force, CWW, and ITI
- Identified programs/activities that could be enhanced or built upon

Country Landscape Analysis

WASHplus completed desk reviews for seven countries. These included a quick background of the country, a landscape analysis for NTDs and WASH and an exploration of any integrated programming. The country findings and recommendations for Phase 2 are summarized here.

Ghana: Ghana does have government commitment in WASH and trachoma is nearing elimination. STH is not a priority in Ghana, so schistosomiasis represents the clearest opportunity to develop an integrated program. However, Ghana is not a high priority country to the Task Force, CWW or ITI. We would not recommend Ghana as a country to consider for a Phase 2 assessment.

Niger: The Government of Niger has coordination mechanisms in place for NTDs and WASH. Though it is likely that they are not linked, an integration program could explore how to integrate these programs effectively. The review indicates that materials exist that could possibly be adapted and incorporated into WASH and/or NTD programs. Further, this is a country of interest

to the Task Force and ITI. We would recommend Niger as a country to consider for a Phase 2 assessment.

Senegal: Though the government seems to have a plan to combat NTDs, this review did not find robust coordination structures in place. Senegal is not a country of high interest to the Task Force, CWW, and ITI. Additional information from USAID indicated that the USAID NTD program is just starting. Further, the landscape seems to be tough politically and may not be the best place to pursue at this time. We would not recommend conducting a country assessment in Senegal.

Mozambique: Great need exists in Mozambique, yet it seems that the sectors are not well developed. Further the emphasis in water and sanitation has been on urban rather than rural infrastructure, which adds a level of challenge. NTD need is great particularly in four provinces: Cabo Delgado, Nampula, Niassa, and Zambezia. Mozambique is a country of interest to the Task Force, CWW, and ITI. We would not recommend Mozambique as a country to consider for a Phase 2 assessment at this time.

Tanzania: The government is particularly interested in NTD-WASH integration and is leading efforts in this area with numerous NGOs contributing. This political climate makes this a particularly interesting country to consider since a range of activities might be of interest to build on or foster. Conversely, since things are already happening, perhaps the need is not as great. CWW and ITI place Tanzania as a country of keen interest. We would recommend Tanzania as a country in which to conduct a Phase 2 country assessment.

Uganda: Uganda has relatively sophisticated WASH and NTD sectors and government and NGO sector coordination mechanisms in place, providing a solid platform for collaboration. ENVISION has a robust set of NTD activities. The government has strongly endorsed taking CLTS to scale across the country and WASH in Schools is quite advanced in Uganda. FHI 360 has a presence in WASHplus and other mission funded health programs. Uganda's Child Health Days program used materials that could perhaps be reviewed and adapted with few inputs. CWW ranks Uganda high in this list of countries, though ITI ranks it behind a number of others. This set of circumstances makes Uganda a strong candidate in which to conduct a Phase 2 assessment.

Bangladesh: Bangladesh has the second highest STH disease incidence in the world. The country has a strong track record working to reduce lymphatic filariasis and a committed infrastructure. WASH programs are also extensive. FHI 360 has a strong presence in Bangladesh with activities both in NTD and WASH. Because Bangladesh only has one target disease, STH, we would be able to concentrate efforts to one set of integrated results. This is a country of interest to the Task Force and CWW. ITI is not interested since trachoma is not an issue in Bangladesh. One limiting factor is the current political and social situation that makes

Bangladesh a difficult place in which to work. Nonetheless, we would tentatively recommend this as a country to consider for a Phase 2 country assessment.

Next Steps

As mentioned, the time is right to develop some WASH-NTD integration activities in countries that could serve both as models that could be scaled up and contribute to the evidence for integrated programming. A WaterAid report on trachoma indicated that “With increasing pressure on government and aid resources, it is critical that integrated approaches are implemented to deliver better value for money, and more crucially, sustainable, long-term impact.”³²

In analyzing the information gathered by this review and critically reviewing the landscape of the different countries examined, WASHplus recommends initially conducting an assessment in two of the following countries listed in order of priority: Uganda, Tanzania, Bangladesh, Niger.

As discussed with USAID, WASHplus proposes partnering with the Task Force and its partners to jointly assess these countries and to develop tools that countries can use to conduct their own situation analysis, identify gaps, and propose integrated solutions. We will review and adapt existing tools to avoid “reinventing the wheel” and package them in a way that fosters critical analysis of WASH-NTD integration threats and opportunities.

Once the country assessments are complete, we will work closely with USAID and other identified partners to design interventions in one to two countries that would both contribute to the evidence base and test models of integration. In addition, we will share the results of the country assessments so that others can learn from our experience.

³² Hamilton, H, Y Velleman, WASHing away blinding trachoma, Sightsavers and WaterAid, April 2013.

Country Reports

Uganda Country Profile

Background

Uganda is one of the poorest nations in the world with poverty deeply entrenched in rural areas. Ranking 161 out of 186 on the Human Development Index, 87 percent of the nearly 34 million people reside in rural areas where farming is the main source of income. Uganda has embraced decentralization and power has devolved to 112 districts in 4 geographical regions: Northern, Eastern, Central, and Western. Three-quarters of families live in houses made of temporary materials. Water supply and sanitation are recognized by the government as key factors contributing to underdevelopment. More than one-third of the population lives without a safe water supply and over 50 percent have no sanitation facilities.³³ In rural areas these figures are worse. Ugandans practice open defecation or as possible share basic pit latrines. An annual population growth rate of 5 percent stresses the currently available water and sanitation services. Further, this lack of access to a safe water supply and adequate sanitation, especially during the dry season, leads to a high burden of neglected tropical diseases (NTDs). Controlling these diseases is part Uganda's National Minimum Health Care Package as highlighted in the Health Sector Strategic and Investment Plan. The Master NTD Strategic Plan (2012–2016) aims to scale up NTD control efforts to reduce the burden of NTDs to a level where they no longer have public health importance.

NTD Landscape

The Government of Uganda established the National Plan for Integrated Control of NTDs in 2007 with an NTD Secretariat that links vertical disease-specific program managers and their partners. More recently the government appointed an NTD Focal Person within the MOH to chair the NTD Secretariat. An NTD Steering Committee is composed of government entities from National Disease Control and Community Health Services, representatives of all ministries involved in the NTD Control Programme, and representatives of major partners, including the USAID/ENVISION program, NGOs, and stakeholders overseeing NTD program implementation. The existence of a national plan and these coordination bodies provide an excellent platform for NTD program oversight and harmonization of inputs. Thus far, the program has integrated training manuals, field guides, registers, and training, messaging, and mass drug administration (MDA) and post-MDA monitoring.

In May 2012, the President of Uganda launched an integrated mass treatment against NTDs program, focused on Northern Uganda. This launch renewed Government of Uganda (GOU)

³³WHO/UNICEF Joint Monitoring Program for Water Supply and Sanitation 2012 statistics: access to an improved water source for rural areas is 68 percent and improved sanitation 34 percent.

commitment to NTD control and galvanized district leaders to participate more actively in NTD control activities.

The MOH recently streamlined MDA drug donations. Under this arrangement, the National Medical Stores are now required to handle drugs from point of entry to the districts.

Burden of Diseases

Soil-transmitted Helminthiases (STH)

Among STH, hookworm infection is the most widespread throughout Uganda with prevalence in excess of 60 percent to 85 percent of the schools surveyed by the government. Whipworm and roundworm are concentrated in southwest Uganda, where prevalence has been noted as high as 89 percent. STH transmission is influenced by temperature and rainfall. MDAs for STH began in 2003 with support from the Schistosomiasis Control Initiative and funding from the Bill and Melinda Gates Foundation.

Schistosomiasis (SCH)

The Ministry of Health's Vector Control Division carried out studies between 1988 and 2009 that found *Schistosoma mansoni* (intestinal bilharziasis) is prevalent in 63 of 112 districts, and *S. haematobium* (urinary bilharziasis) in 6 districts. Another study estimated that 4 million people are infected and 17 million at risk.³⁴ High prevalence and intensity of infection are found in communities along large water bodies.³⁵

According to the Government's Master NTD Strategic Plan only 43 of the 63 districts endemic for schistosomiasis have benefited from mass treatment. The government has recognized the critical importance of sanitation improvements, behavior change among communities, and snail control, but has limited funds to address them.

Trachoma

Trachoma is known to be endemic in 35 districts where approximately 700,000 children < 10 years of age have active disease and another 7 million are at risk of infection. The government estimates that over 47,000 people are blind from trachoma. Karamoja is the sub-region with the greatest burden of trachoma. The State Minister for Primary Health Care launched the Karamoja and Busoga sub-regional trachoma elimination program in 2012 because of these high rates of

³⁴ Kabatereine et al, 2006.

³⁵ Neglected tropical diseases in Uganda: the prospect and challenge of integrated control, Trends Parasitology. 2007 October; 23(10-3): 485–493.

infection. Trachoma elimination efforts using MDA commenced in 2007 with financial support from USAID. All the known endemic districts are now implementing MDA.

Major NTD Implementing Partners

Organization	Activity	Geographic Region
NTD Control Program in Uganda	<ul style="list-style-type: none"> Conducts mapping for schistosomiasis, trachoma, and STH (among others) 	
2007–2012	<ul style="list-style-type: none"> Builds capacity 	
USAID	<ul style="list-style-type: none"> Trains individuals at central, regional, district, and community levels for PC-related activities, including MOH staff, trainers, supervisors, teachers and community drug distributors in preparation for MDA Finances and coordinates MDA 	
ENVISION in coordination with MOH	<ul style="list-style-type: none"> Provides fixed obligated grants to 84 districts to support MDA implementation targeting 2.5 million people for schistosomiasis, 8.3 million children ages 5-14 for STH and 9.3 million people for trachoma 	<ul style="list-style-type: none"> National
2013–2016		
USAID	<ul style="list-style-type: none"> Completes trachoma baseline mapping Provides technical assistance in conducting social mobilization and communication activities (printed materials, radio spots, and mobile public announcements) Strengthens capacity in all aspects of NTDs Conducts disease impact assessments, mapping Provides technical assistance in M&E through data quality assessments, supportive supervision and improved information sharing 	
International Trachoma Initiative (ITI)	<ul style="list-style-type: none"> Delivered more than 13 million Zithromax treatments since 2007 Trained media on NTDs (with RTI) 	

WASH Landscape

Uganda is considered at the forefront of sub-Saharan countries in reforming its water supply and sanitation (WSS) sector, although reforms have favored urban over rural improvements. WSS reform and expansion was highlighted in Uganda's national Poverty Eradication Action Plan (PEAP), and is now emphasized in PEAP's replacement document, the National Development Plan for 2010/11–2014/15 and the current Health Sector Strategic Plan. These and other key strategy and policy documents have all advocated for WSS reform.

Urban areas have received greater attention hence this discussion will focus on rural WASH. The Ugandan rural water sector is anchored in the Rural Water Department in the Directorate of Water Development, Ministry of Water and Environment. The Department provides the rural population with improved water sources, such as deep boreholes, hand dug shallow wells, protected springs, gravity flow schemes and some rainwater harvesting.

Sanitation has no line or leading ministry and falls under several: MOH leads household sanitation and hygiene; Ministry of Education and Sports leads hygiene promotion and sanitation in schools; Ministry of Finance, Planning, and Economic Development leads mobilization and allocation of funds; and Ministry of Water and Environment provides sanitation/hygiene facilities in rural growth centers and public places and is in charge of promoting good hygiene and sanitation practices in the vicinity of water facilities. In 2001, the three key ministries of health, water, and education signed a Memorandum of Understanding (MOU) to agree on shared responsibilities.

Decentralization places responsibility for WASH planning, implementation, management, and back-up at the district level. To support this, Uganda has established an advisory structure through Technical Support Units (TSUs), each servicing 8–12 districts. They serve as arm-extendors of the national government. Activities are coordinated through district water offices and through District Water and Sanitation Committees.

In 2002, Uganda adopted a Sector Wide Approach (SWAp) for government and development partners to follow a single policy and expenditure program. The Water and Sanitation Sector Working Group composed of the relevant ministries, donors, and NGOs meets regularly. The National Sanitation Working Group is a sub-group to oversee MOU implementation and to coordinate sector activities, lobby for funding, and support policy development. The Ugandan Water and Sanitation Network (UWASNET) strengthens nongovernmental organizations' and community-based organizations' capacity and coordinates collaboration among WASH stakeholders.

Uganda is one of a few countries to mandate that each household have a latrine. Although laudable, this goal is alone insufficient to stop hygiene- and sanitation-related diseases, largely because open defecation is still widely practiced in both rural and urban areas. The government

has strongly endorsed taking to scale community-led total sanitation (CLTS) and accompanying sanitation marketing to stop open defecation.

Major WASH Players

The following highlights some major WASH activities ongoing in Uganda that could potentially serve as platforms for WASH and NTD program integration.

Organization	Activity	Geographic Region
<p>Mercy Corps Title II program</p> <p>2008–2013</p> <p>\$ 34 million</p>	<ul style="list-style-type: none"> • Implements a multi-faceted community development program increasing access to food and nutrition, MCH, and WASH. 	<ul style="list-style-type: none"> • Karamoja, effective FY 2012
<p>USAID/W’s Development Grant Program</p> <p>\$ 514 million</p>	<ul style="list-style-type: none"> • Provides small grants to nontraditional USAID partners to improve access to water 	<ul style="list-style-type: none"> • Western and Southwestern Uganda
<p>FHI 360/Community Connector</p> <p>FY 2012–2017</p> <p>\$ 1.25 million</p>	<ul style="list-style-type: none"> • Engages in small-scale WASH interventions, including latrines, household water treatment, and safe storage interventions 	<ul style="list-style-type: none"> • Unknown
<p>WaterAid</p>	<ul style="list-style-type: none"> • Assists government to ensure that Highly Indebted Poor Country Initiative funding is targeted to reach poorest through community-managed WASH projects • Targets 9 districts with WASH package, including hand-dug shallow wells, spring protection, rainwater harvesting, borehole maintenance, microfinance, communal latrine blocks 	<ul style="list-style-type: none"> • National • Katakwi and Amuria (East) • Napak, Nakapiripirit, and Kotido (North) • Masindi (West) • Kampala and Mubende (Central)
<p>AMREF</p>	<ul style="list-style-type: none"> • Implements WASH in schools • Helps design latrines 	<ul style="list-style-type: none"> • Kabale District, Southwest

Uganda Village Project	<ul style="list-style-type: none"> Promotes community small sanitation practices, e.g., tippy-taps outside of latrines Supports sanitation pushes, i.e., innovative and inclusive campaigns to increase latrine coverage and sanitation measures 	<ul style="list-style-type: none"> 70 villages
Water School Uganda Most ended in 2012	<ul style="list-style-type: none"> Increases visibility of SODIS within schools and communities 	<ul style="list-style-type: none"> Many districts throughout Uganda
Dutch WASH Alliance (JESE, HEWASA, PROTOS, and SNV)	<ul style="list-style-type: none"> Conducts diverse WASH activities 	<ul style="list-style-type: none"> Rwenzori (2 districts)
AMREF and CARITAS	<ul style="list-style-type: none"> Conducts diverse WASH activities Provides clean drinking water, basic sanitation facilities, and hygiene education in schools 	<ul style="list-style-type: none"> Northern Uganda Kitgum, Lamwo, Gulu, Pader, and Agago (North)
IRC/WASHTech 2011–2013 Funded by EC FP7–Africa	<ul style="list-style-type: none"> Strengthens sector capacity to invest effectively in new technologies, through research and framework development, which assesses the potential of new technologies introduced into innovative decentralized systems. 	<ul style="list-style-type: none"> National
Joint Water and Sanitation Sector Program through SWAp 2008–2013	<ul style="list-style-type: none"> Supports achieving sector targets Serves 1,410,000 rural population, 373,000 in rural growth centers, and 155,000 in small towns with access to basic sanitation and hygiene facilities 	<ul style="list-style-type: none"> National
DANIDA, AFDB, ADA, SIDA, DFID, EU, GTZ 151 \$ Million	<ul style="list-style-type: none"> Water resources management Sector program support for capacity building Sector reforms Water for production 	

Integrated WASH/NTDs Initiatives

Uganda’s Child Health Days Plus program from 2004–2008 combined several interventions for preschool, school-age children, and women of childbearing age, such as immunizations, vitamin A supplements, deworming, breastfeeding, sanitation and hygiene promotion, and insecticide-treated nets. The “Plus” component addressed NTDs, vision screening, and early infant diagnosis of HIV/AIDS to administer early antiretroviral therapy.

The MOH supports the Surgery, Antibiotics, Face Washing, and Environmental Sanitation (SAFE) strategy to eliminate trachoma in 35 districts, targeting 11 million persons.

Implementation of the F and E components has been very slow, considering the burden of trachoma in the country. Face washing campaigns are limited to schools and a lot has to be done to improve environmental sanitation in communities.

Discussion

Uganda has relatively sophisticated WASH and NTD sectors and government and NGO sector coordination mechanisms in place, providing a solid platform for collaboration. ENVISION has a robust set of NTD activities. In addition, Uganda is one country that the Global Health Taskforce, International Trachoma Initiative, and Children without Worms would be interested in exploring further.

This set of circumstances makes Uganda a strong candidate for exploring further NTD/WASH integration opportunities. Given that WASH in schools is prominent in much WASH work in Uganda, it may take relatively few inputs to complement existing packages, for example, adding face washing to a hygiene package. Another possible area for an integrated program focus is to build on the government-initiated trachoma elimination program in Karamoja and Busoga by adding or enhancing the F and E components to the SAFE strategy. The connection between NTD and environmental health could be added as a theme to CLTS “triggering” events.

Uganda’s Child Health Days Plus program (2004–2008) could provide lessons learned to infuse a new integrated program with that knowledge. Further, given that materials exist (e.g., the NTD integrated training manuals, field guides, and messaging), by evaluating and adapting them, it could be relatively easy to integrate WASH into NTD curriculum materials and NTD messages into WASH activities and materials.

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Tanzania Country Profile

Background

Tanzania, a country that ranks 152 out of 186 countries in the Human Development Index, has enjoyed political and economic stability over the past decade. Its annual growth rate has averaged 6.7 percent since 2006, one of the best in sub-Saharan Africa. Tanzania has 30 regions with 148 districts and a predominantly rural population of about 43.5 million, 44 percent of whom are under 15 years old. Tanzania has made impressive gains in reducing infant and under-5 mortality rates, though nearly 58 percent of the population earns less than US\$1 per day. According to 2011 UNICEF statistics, 46 percent of Tanzanians lack access to improved drinking water sources and 87 percent have no access to improved sanitation.

Neglected tropical diseases are prevalent throughout the country, though certain areas of the country face more severe burdens than others due to geographic and environmental conditions. The country is endemic with all three of the NTDs that are the focus of this study: schistosomiasis (SCH), trachoma, and the soil-transmitted helminthes (STH) (hookworm, ascariasis, and trichuriasis). An accurate accounting of the number of Tanzanians infected with each NTD does not currently exist. However, prevalence rates of schistosomiasis and soil-transmitted helminthes are above 80 percent in some areas. The prominence of infection is attributed primarily to poor environmental sanitation and inadequate access to safe water, conditions that lead to continued exposure to the causal parasites and thus high rates of re-infection.⁴

NTD Landscape

Mothers and children in Tanzania are disproportionately affected by NTDs, leading to increased maternal morbidity and mortality, poor pregnancy outcomes, and impairment of childhood development. NTDs also exacerbate under nutrition; nutritional losses caused by NTDs result in 1 in 3 Tanzanian children being underweight for their age and almost half suffering stunted growth.⁴

Burden of Disease

Soil-transmitted Helminthiasis (STH)

Soil-transmitted helminthes are found countrywide; in some areas, the prevalence rates are above 80 percent, making this disease a primary public health concern.

Schistosomiasis

The available evidence indicates that schistosomiasis (urinary and intestinal) is still highly endemic throughout Tanzania and causes significant morbidity. In some areas the prevalence is above 80 percent. A 2012 report indicated that over half the population (about 23.2 million people) is infected with schistosomiasis. Because the disease is so widely distributed, the entire population remains at risk of schistosomiasis and disease prevalence appears to increase with population increase (from 19% in 1977 to approximately 51.5% in 2012).

A 2013 national review of schistosomiasis called for integrated control programs, beyond preventive chemotherapy. It called for more efforts to enforce health education and recommended more action in improving access and supply of clean tap water and adequate sanitation, especially the use of toilets.

Trachoma

Trachoma is endemic in 43 districts generally clustered in the center and southern areas of the country. The target date for eliminating blinding trachoma is 2020. Approximately 10 million people are estimated to be at risk and 130,000 people live with trichiasis. Tanzania was one of the first countries worldwide to pilot the implementation of the WHO-recommended Surgery, Antibiotics, Face Washing, and Environmental Sanitation (SAFE) strategy for trachoma control, beginning interventions in 1999.

NTD Players

The Government of Tanzania has a Neglected Tropical Diseases Control Programme (TZNTDCP) housed within the Ministry of Health. In 2012, the TZNTDCP completed the Strategic Master Plan for 2012–2017 that outlines the needs for all aspects of the TZNTDCP and costing. Some of the TZNTDCP goals for elimination and control strategies are to

- Conduct trachoma mapping where necessary to guide SAFE implementation
- Conduct trachoma impact assessments in appropriate areas
- Establish STH and schistosomiasis sentinel and spot check sites that collect data per WHO guidelines
- Target primary school age children (5–14 years) the highest risk group for STH and schistosomiasis control efforts; main intervention is mass drug administration (MDA) to pupils by trained school teachers supported by health personnel, complemented by school health education and environmental sanitation
- Implement the SAFE strategy for three to five years before conducting impact assessments in the quest for elimination

The Strategic Master Plan for the NTD Control Programme (2012–2017) is the roadmap by which the "Tanzania free of NTD's" vision can be achieved. In March 2013 the government pledged to continue collaborating with development partners and other stakeholders to address all challenges facing the strategic master plan through developing sustainable programs, with a key notion that the government is at the steering wheel.

NTD control in Tanzania has been a collaborative effort of the national government, primarily through the Ministry of Health and Social Welfare (MOHSW) and international NTD control organizations. Several national programs have been established to address individual NTDs with the help of those currently operating in Tanzania—the Schistosomiasis Control Initiative, International Trachoma Initiative, and others providing financial and technical support such as Helen Keller International (HKI). Partners have

developed strategic plans for controlling certain NTDs, and conducted epidemiological mapping and disease prevalence surveys to determine treatment needs.

Organization	Activity	Geographic Region
USAID Neglected Tropical Disease Control Program (NTDCP)	Tanzania NTD Master Plan drafted in 2012	National
June 2010–March 2012	Works with TZNTDCP to eliminate lymphatic filariasis (LF) and trachoma	
	Prepares for trachoma impact surveys in districts that have implemented at least three years of the SAFE strategy	
IMA World Health Project		
ENVISION Grantee: IMA World Health	Completing trachoma mapping in 17 districts	MDA activities for the four targeted NTDs in the regions of Dodoma, Katavi, Lindi, Manyara, Mtwara, Pwani, Rukwa, Singida, and Tabora
	Provides training in the areas of NTD program management, M&E, TIPAC, epidemiological methods, and sampling	
	Develops materials and train district NTD team (25 districts) on M&E for integrated NTD activities	
	Trains a multi-sectoral district team (20 districts) in approaches to community mobilization	
Helen Keller International (HKI)	Works closely with the Ministry of Health and Social Welfare, HKI supports the implementation of the SAFE strategy to eliminate trachoma as a cause of blindness in Tanzania.	HKI targets two priority regions for trachoma control, Lindi and Mtwara, where the disease is most prevalent.
International Trachoma Initiative (ITI)	Supporting Tanzania to achieve the elimination of blinding trachoma by the year 2020.	N/A
	The Tanzania national program received nearly 36 million Zithromax® treatments since it began working with ITI in 1999.	
	In 2011, ITI and the Tanzania national program targeted about 4 million people for treatment.	

Imperial College
London

Implements a school health program to treat school children in Tanzania for schistosomiasis and intestinal helminthes N/A

WASH Landscape

In Tanzania, the Ministry of Water and Irrigation (MWI) oversees all national water-related functions. Within MWI, the Commercial Water Supply and Sewerage Division coordinates and manages the urban sub-sector. Rural WSS service is approached from a community ownership and management concept led by user associations and Local Government Authorities (LGAs). The Ministry of Health and Social Welfare has a limited role in developing sanitation policy.

The Government of Tanzania is effectively reforming its water supply and sanitation institutions by assigning service delivery to local providers, incorporating commercial principles into service delivery models, and instituting cost recovery strategies.³⁶

The government and donor community have adopted a Sector-Wide Approach to Planning (SWAp) that is based on community-demand orientation, decentralized management through local governments, and combined with central government facilitation and private sector service delivery. Tanzania receives considerable donor support for the rural water and sanitation sector. The World Bank and the African Development Bank have been particularly active in Tanzania's water sector, as have a number of international and local NGOs.

Tanzania is ranked the second lowest in terms of access to improved sanitation worldwide out of 171 countries that reported statistics for 2010. Only 1 in 10 Tanzanians has access to an improved sanitation facility, such as a flush toilet connected to a sewage system or septic tank or a covered pit latrine not shared with other households.² An economic study concludes that impacts resulting from poor sanitation and hygiene cost the Tanzanian economy 301 Billion Shillings (US\$ 206 million) per year, or the equivalent of 1.0 percent of annual Gross Domestic Product (GDP).²

Institutional and policy frameworks for sanitation lag behind those of the water supply sector. The sanitation sector lacks accurate data on the current state of latrine coverage and well as strategies proven effective to persuade and enable rural and urban households to invest in improved sanitation.

Improvements in the sanitation and hygiene sector have been triggered by the AfricaSan conference in early 2008, the International Year of Sanitation and the African Union summit on water and sanitation during Tanzania's President Kikwete's chairmanship. WaterAid, UNICEF and WSP have raised the sector's political profile, and new personalities in key positions at the Ministry of Health and Social Welfare (MOHSW) and in UNICEF have championed WASH.

³⁶ USAID report

2. [Briefing: Economic Impact of Water and Sanitation](#), 2012. United Republic of Tanzania.

3. [Water Supply and Sanitation in Tanzania: Turning Finance into Services for 2015 and Beyond](#). Water and Sanitation Program.

4. [Tanzania Overview](#). Imperial College London.

5. [Neglected Tropical Disease Control Program Final Report](#), 2012. RTI International.

Though gains have been slow in the areas of community water supply and sanitation, great progress has been made in WASH in schools. An informal coalition of actors (WaterAid, SNV, UNICEF and DFID) has given the issue new momentum with a joint SNV, UNICEF, and WaterAid initiative to conduct a school WASH mapping exercise, similar to water-point mapping. WaterAid is supporting UNICEF's work in spearheading efforts to address policy weaknesses in school sanitation.

Major WASH Players and Levels of Investment

Organization	Activity	Geographic Region
African Development Bank	<ul style="list-style-type: none"> Supports rural water supply and sanitation infrastructure and capacity building 	NA
Water and Sanitation Program (WSP)	<ul style="list-style-type: none"> Supports national WSS sector Implements sanitation/hygiene sub-sector programs. 	NA
PLAN International And National WASH Coalition	<ul style="list-style-type: none"> Use community-led initiatives to improve sanitation behavior and hand washing practices Support local entrepreneurs to construct improved toilets 	NA
USAID/Tanzania Integrated Water Sanitation and Hygiene Program (iWASH), 2010-2013	<ul style="list-style-type: none"> Supports sustainable, market-driven water supply, sanitation, and hygiene services to improve health and increase economic resiliency of the poor 	Rural areas and small towns
FIU, CARE, Winrock, Wateraid, WWF		
WaterAid	<ul style="list-style-type: none"> Policy and service delivery programs. Provides a safe drinking-water source, sanitation facilities and hygiene education to children in schools. Sanitation and hygiene promotion in unplanned urban settlements Promotes low cost pit latrine emptying technologies (Gulper technology) 	NA Unplanned urban settlements

Integrated WASH/NTDs Initiatives

The Neglected Tropical Diseases Control Programme outlined in the March 2013 meeting that maximized impact for reducing NTDs in Tanzania will be realized by integrating water, sanitation and hygiene into NTD programs.

WaterAid has identified the following districts in which it works that have the potential for WASH and NTD integration.

WaterAid-supported District	NTD Endemicity	Partners-INGO-Supporting NTD Work
Babati, Mbulu, Urambo, Iramba, Mkalama	LF,STH, SCHISTO	IMA WORLD HEALTH/USAID
Nzega, Bahi, Chamwino, Mpwapwa, Rufiji	LF, STH, SCHISTO, TRACHOMA	IMA WORLD HEALTH/USAID
Gairo	LF, STH, SCHISTO, ONCHO	APOC/USAID
Kilosa	LF,STH, SCHISTO, TRACHOMA, ONCHO	APOC/USAID/SIGHTSAVERS
Mvomero	LF, STH, SCHISTO, ONCHO	APOC/USAID/SIGHTSAVERS
Njombe, Mbozi, Momba	LF, STH, SCHISTO	APOC/USAID

Discussion and Analysis

NTDs are a serious health concern in Tanzania and NTD control will benefit broader public health goals. Intestinal worms co-infection with malaria or schistosomiasis can exacerbate anemia, especially in mothers and young children. This health problem is common in Tanzania due to the wide geographic overlap of malaria and NTD endemicity. In addition, NTD control may help curb the spread of HIV/AIDS—studies have found that infection with schistosomiasis may increase susceptibility to HIV transmission and the development of AIDS. This could be an important contribution to the USAID Tanzania HIV/AIDS program.

Tanzania is moving ahead in WASH-NTD integration. Dr. Upendo Mwingira, the coordinator for the national NTD control program, said in a recent conference that “the war against the NTDs in the country is fiercely fought on three main fronts of medication for prevention, treatment and avoidance through hygiene and environmental cleanliness.”

The TZNTDCP, in collaboration with multi-lateral partners, continues to implement successful deworming programs in schools in 14 of 23 regions throughout the country. The TZNTDCP intends to cover all endemic areas in Tanzania in the short term.

Though leadership is clearly coming from the government, numerous NGOs are working to improve collaboration between the WASH and NTD sectors. WASHplus resource partner, WaterAid, for instance, participates in national NTD meetings and conferences and has started to align its districts with endemic areas. Opportunities exist for USAID to assist in these initiatives.

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Bangladesh Country Profile

Background

With approximately 160 million people, Bangladesh has the world's seventh-largest population and one of its most densely populated. Bangladesh ranks 146 out of 186 countries on the Human Development Index.³⁷ Almost one-third of Bangladesh floods each year making it particularly vulnerable to climate change. By 2050, up to 8 percent of the low-lying lands may become permanently under water.³⁸

Bangladesh has 7 divisions sub-divided into 21 regions and 64 districts. According to WHO, maternal and child health is improving, though neonatal and maternal mortality remains unacceptably high. Malnutrition, to which poor access to clean water and sanitation contribute 50 percent, is widespread in Bangladesh. Nearly half of pregnant women suffer from malnutrition and anemia and 48 percent of children are moderately underweight; one-third suffer from stunting.³⁹

The WHO/UNICEF Joint Monitoring Program estimates that 56 percent of the population has access to improved sanitation, while 81 percent use drinking-water from improved sources.⁴⁰ Arsenic contamination of drinking water remains a serious problem causing an estimated 9,100 deaths per year.⁴¹ A 2011 World Bank study estimates the economic impacts resulting from poor sanitation and hygiene cost the Bangladesh economy US\$4.2 billion per year, or the equivalent of 6.3 percent of annual Gross Domestic Product.⁴²

Soil-transmitted helminthiasis (STH) is a major public health burden in Bangladesh and affects as many as 92 percent of school-age children in parts of the country. The other major neglected tropical diseases are Kala-azar, lymphatic filariasis and dengue. Schistosomiasis and trachoma are not of concern in Bangladesh.

NTD Landscape

Burden of Diseases

Soil-transmitted Helmenthiasis (STH)

STH is a major NTD in Bangladesh endemic in all 64 districts. Lymphatic filariasis, another NTD, is endemic in 32 districts and visceral leishmaniasis (kala-azar) is endemic in 34 districts with an estimated 45,000 cases. Only STH is relevant for this review. South Asia accounts for approximately one-quarter of the world's STH infections. Bangladesh is second to India in having the most cases of STH worldwide. (These numbers are based on data published in 2006; more recent data from the *Global Atlas of Helminth Infections* are not yet available for South Asia.⁴³) However, mass drug administration (MDA) has been administered in schools in all 64 districts and the STH rate fell from 70.8 percent in 2005 to 27.2 percent

³⁷Human Development Report 2013. The Rise of the South: Human Progress in a Diverse World. UNDP, 2013.

³⁸[USAID Bangladesh: Environment Website](#)

³⁹[WHO Country Cooperation Strategy 2008-2013: Bangladesh](#). WHO.

⁴⁰[Joint Monitoring Programme for Water Supply and Sanitation, 2012](#). UNICEF; WHO.

⁴¹[The effect of arsenic mitigation measures on disease burden in Bangladesh](#)

⁴²[Economic impacts of inadequate sanitation in Bangladesh](#), 2012. Water and Sanitation Program.

⁴³Lobo, PLoS Medicine, 2011.

in 2010.⁴⁴ In addition to harming children’s school performance and maternal and child health, STH infections also affect worker productivity. In Bangladesh, research showed that iron deficiency anemia negatively affects wage earnings.

NTD Players

Bangladesh has an STH control program, though information on this program was quite thin. Children without Worms helped to distribute Mebendazole donations from [Johnson & Johnson](#) that dewormed about 25 percent of Bangladesh's children aged 6–12 years by 2009. With additional drugs sources, the program has dewormed a significant percent of Bangladesh's school-aged population. A survey from about 2009 indicated that hookworm infections declined from 79 percent to 23 percent over a period of two years.

Although not a disease of concern for this review, Bangladesh is a country with endemic lymphatic filariasis (LF) as well as STH. In 2001, The Ministry of Health and Family Welfare launched a program to eliminate LF by 2015. The government sought LF elimination through MDA. Bangladesh is one of the first countries to use the WHO transmission assessment survey to verify the process.

Organization	Activity	Geographic Region
END in Asia/Bangladesh	Assists ministries of health in Bangladesh and other Asian countries.	National
FHI 360	Conducts STH surveys Develops communication materials	

WASH Landscape

WASH services in Bangladesh have improved significantly in the last decade. In 2012 the Government of Bangladesh (GOB) reported that as of 2010, 121 million people have access to improved water supply and 83 million have improved sanitation facilities. However, significant challenges remain such as the large numbers of households using shared—i.e., unimproved latrines—and the estimated 20 million people still consuming arsenic contaminated water. Extending and maintaining service provision is especially difficult in rapidly growing urban slums.

The public sector allocation for the WASH sector more than doubled in the past five years, from 2.3 percent of the Annual Development Program in 2007 to 5.6 percent in 2011.⁴⁵ Funding for water supply exceeds that for sanitation and hygiene promotion and is skewed to urban areas.

The responsibility for the WASH sector is vested in the Local Government Division under the Ministry of Local Government, Rural Development, and Cooperatives (MOLGRDC), which shares with the Ministry of Planning and the Ministry of Finance the tasks of policy decisions, sectoral allocation, and funding, as

⁴⁴ END in Asia Bangladesh Work Plan.

⁴⁵ WaterAid. 2011. Bangladesh Country Strategy Plan.

well as project appraisals, approval, evaluation, and monitoring. The Department of Public Health and Engineering under the MOLGRDC is responsible for providing water and sanitation services in rural and urban areas.

The GOB has taken the following actions to meet its WASH commitments:

1. Implements a special project on sanitation in FY13 to address the needs of geographically difficult areas and the most marginalized groups in rural areas and urban slums.
2. Approved the Arsenic Implementation Plan for the water sector. Implements, on a priority basis, a project to provide safe drinking water in areas with very high arsenic contamination and low safe water coverage and in hydro-geologically difficult, water scarce and hard to reach areas.
3. Implements the Sector Development Plan (SDP) short-term priorities (2011-2015) and related sector policies and strategies with time-bound actions and backed by complementary instruments and government directives.
4. Increased allocation for sanitation and water supply in the budget by 50 percent to reduce the resource gap to implement the SDP short-term priorities with particular attention to earmarking resources proportionately to sustain improvement in sanitation coverage.

Major WASH Players

Many donors are investing in WASH in Bangladesh. Key stakeholders include bilateral donors USAID, DANIDA, and JICA, and multilateral lending agencies such as the Asian Development Bank, World Bank/IDA, and UNICEF. In total, external funding sources invest approximately \$44 million annually in WASH.

Organization	Activity	Geographic Region
WHO/Bangladesh	<ul style="list-style-type: none"> • Develops Water Safety Plans • Provides sanitation in disaster prone areas 	N/A
FHI 360/Alive & Thrive	<ul style="list-style-type: none"> • Sponsors hand washing campaigns and infant/child feeding programs 	N/A
BRAC—WASH program	<ul style="list-style-type: none"> • Provides sustainable access to sanitation, water, and hygiene in hard-to-reach areas for the underserved rural people of Bangladesh 	N/A
FHI 360/WASHplus	<ul style="list-style-type: none"> • Increases access to sustainable safe water, sanitation, and hygiene solutions in challenging districts • Builds capacity to operate and maintain water and sanitation facilities to ensure sustainable project interventions and impact • Strengthens coordinated WASH-nutrition programming 	Char Fasson, Daulatkhan, Galachipa, and Kalapara

CARE/Bangladesh FRESH Project	<ul style="list-style-type: none"> Increases livelihood opportunities and resilience of households and individuals to reduce the impact of future disasters; provide access to WASH facilities (Flood Resistant Shelter and Sanitation project) 	Southwest
CARE/Bangladesh Bangladesh National Health Service Delivery Project (BNHSDP)	<ul style="list-style-type: none"> Delivers essential service packages through a network of 25 NGO clinics to reach around 20 million people in poor and underserved communities Provides strategic and technical support in health, nutrition, maternal and child health 	N/A
Save the Children School Health & Nutrition Program	<ul style="list-style-type: none"> Works in communities to mobilize parents and families to ensure children are dewormed and have access to safe water and sanitation in school 	N/A
CARE/Bangladesh Improving Women's Health and Education through Effective Learning (IWHEEL)	<ul style="list-style-type: none"> Improves factory worker access to health services and sanitation Improves health seeking behavior through visual training sessions, micro health insurance, and mobile health clinic support to the community 	Mirpur slums, Dhaka
WaterAid	<ul style="list-style-type: none"> Ensure water and sanitation rights, promote hygiene, develop capacity of sector stakeholders, and generate and disseminate critical knowledge about sector policy Support small local NGOs carry out WASH interventions WASH programs focus on behavior changes through hand washing to reduce diarrheal diseases WASH-nutrition linkages. Conduct hygiene baseline with Ministry of Local Government 	6 programs in 24 districts 1.6 million target population.

Integrated NTD–WASH Initiatives

Bangladesh has several different programs that have WASH and NTD components.

Organization	Activity	Geographic Region
SHIKHON /Save the Children	<ul style="list-style-type: none"> Mobilize parents and families to ensure that children are dewormed and have access to safe water and sanitation in schools; reached 146,097 children in 5,180 schools in 2011 	N/A

School Health and Nutrition Program/Save the Children	<ul style="list-style-type: none"> • Twice annual deworming and vitamin A supplementation and annual iron supplementation and vision screening • Increased awareness on hand washing with soap 	N/A
WaterAid	<ul style="list-style-type: none"> • Seek opportunities to integrate WASH and NTDs • Use baseline hygiene report to help program integrated WASH-NTD activity 	N/A

Discussion

Bangladesh has great need and a strong donor commitment to WASH programming. Indeed, several organizations have ongoing robust WASH programs. While Bangladesh seems to have a strong program to reduce STH and eliminate lymphatic filariasis, this desk review found limited information on the program in Bangladesh and none was current.

Bangladesh is a country of interest to the Taskforce for Global Health and Children without Worms. Further, FHI 360 has both programs related to NTDs and WASH ongoing in the country. The communication materials that already exist may provide an opportunity to insert information on WASH access and practice to prevent STH.

One downside to moving forward with Bangladesh in Phase 2 is that it is becoming an increasingly difficult place to work with safety concerns and regular strikes that interrupt business and movement.

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Niger Country Profile

Background

Niger is a landlocked country in West Africa at the bottom of the Human Development Index⁴⁶ (186 of 186 countries). Approximately 80 percent of Niger's land mass is desert and the country faces chronic political and food insecurity. Niger has 8 regions and 42 districts and a population of about 15 million⁴⁷ of whom 83 percent live in rural areas, predominantly in the southwestern half of the country.⁴⁸ Niger is not on track to reach its Millennium Development Goal (MDG) for access to an improved water sources. As of 2010, 61 percent of the rural population still uses unimproved sources for drinking water,⁴⁹ and 91 percent of the population practices open defecation.⁵⁰ High population growth rates have negated recent investments to expand access to water and sanitation. USAID estimates that over 20 percent of deaths in Niger are attributable to poor sanitation and hygiene. Schistosomiasis, soil-transmitted helminthiasis (STH), lymphatic filariasis (LF), and trachoma are endemic throughout Niger with prevalence rates varying from one district to another. In 2004, Niger established large-scale schistosomiasis and STH control programs targeting children aged 5–14 years and adults.⁵¹ The integrated treatment of NTDs through mass drug administration (MDA) started in 2007. These programs focused on the control and/or elimination of trachoma, STH, schistosomiasis, and LF. Since 2007, five rounds of integrated MDA have been conducted in 39 of the 42 districts reaching 11 million people. Treatment in the north, particularly Agadez, has been difficult due to security issues.⁵²

NTD Landscape

Burden of Disease

Soil-transmitted Helminthiasis (STH)

The End in Africa project reports that all 42 districts are endemic and 34 of them have ongoing MDA activities treating an estimated 10 million persons over the age of five.⁵³ Peak transmission is usually at the end of the rainy season (September–October) and the lowest transmission rate is at the end of the dry season (April–May).⁵⁴ In 2004 Niger launched its first National Schistosomiasis and STH Control Programme (PNLBG), later becoming the Integrated NTD Control Programme.

⁴⁶UNDP. 2013. Human Development Report 2013: The Rise of the South: Human Progress in a Diverse World. http://hdr.undp.org/en/media/HDR_2013_EN_complete.pdf

⁴⁷WHO. 2009. WHO Niger Country Page. <http://www.who.int/countries/ner/en/>

⁴⁸WHO. 2012. Niger Health Profile. <http://www.who.int/gho/countries/ner.pdf>

⁴⁹WHO/UNICEF. 2012. Joint Monitoring Program for Water and Sanitation. Estimates for the use of Improved Sanitation Facilities: Niger. http://www.wssinfo.org/fileadmin/user_upload/resources/NER_san.pdf

⁵⁰Ibid. http://www.wssinfo.org/fileadmin/user_upload/resources/NIC_wat.pdf

⁵¹Leslie J, Garba A, et al. 2011. Schistosomiasis and Soil-Transmitted Helminth Control in Niger: Cost Effectiveness of School Based and Community Distributed Mass Drug Administration. *PLoS Neglected Tropical Diseases*5(10): e1326.

⁵²End in Africa. 2012. Control of Neglected Tropical Diseases: Annual Workplan October 2011- September 2012. Rev 2. <http://endinafrica.org/wp-content/uploads/2012/11/Niger-NTD-Work-Plan-FY2012.pdf>

⁵³End in Africa. 2012. Control of Neglected Tropical Diseases: Annual Workplan October 2012 – September 2013. <http://endinafrica.org/wp-content/uploads/2013/01/Niger-NTD-Workplan-FY2013.pdf>

⁵⁴WHO. 2006. Communicable Disease Profile for Niger: 2006. http://www.who.int/diseasecontrol_emergencies/toolkits/niger_final.pdf

Schistosomiasis

Schistosomiasis is endemic across 39 districts. In the southern part of the country schistosomiasis is found in all populated areas year round especially in the Niger River Basin and surrounding areas including the capital Niamey and surrounding areas, and the regions of Dosso, Tahoua, Maradi, Zinder, and Diffa.⁵⁵ Thirty districts have ongoing MDA activities for schistosomiasis, targeting roughly 5.6 million persons.⁵⁶

Trachoma

Trachoma is concentrated in the southern regions of Zinder, Diffa, and Maradi and it not endemic in the North.⁵⁷ END in Africa's mapping exercise found that 18 of 42 districts are endemic with a prevalence of at least 10 percent. Since 2002 Niger has implemented the Surgery, Antibiotics, Face Washing, and Environmental Sanitation (SAFE) strategy to eliminate trachoma by 2015.⁵⁸ Seventeen districts have ongoing MDA activities for Trachoma that reach approximately 7.6 million people.⁵⁹

NTD Stakeholders

The Niger Ministry of Health (MOH) drafted its first integrated Plan of Action for NTDs in 2006 and has since followed a phased approach to integrated mass treatment. By 2010, MDA had expanded to cover the entire country. An active NTD Task Force includes NTD control program members, MOH officials, and representatives from international multilateral and nongovernmental organizations (NGOs). The MOH established an NTD Focal Point in 2009 to chair planning and evaluation meetings with the NTD Task Force.⁶⁰

The Ministry of Education and the school health program have a history of close collaboration with the NTD Task Force to include NTD prevention in the primary school curriculum. A workshop titled "Strategy for the Improvement of School Health" was held in 2008, during which NTDs were incorporated into the syllabus for primary school. Teachers continue to play a key role to organize and support MDA in schools.

⁵⁵International Association for Medical Assistance to Travelers. 2012. World Schistosomiasis Risk Chart. http://www.iamat.org/pdf/World_Schistosomiasis_Risk_Chart.pdf

⁵⁶End in Africa. 2012. Control of Neglected Tropical Diseases: Annual Workplan October 2011- September 2012. Rev 2. <http://endinafrica.org/wp-content/uploads/2012/11/Niger-NTD-Work-Plan-FY2012.pdf>

⁵⁷ Carter Center. Fighting Disease: Niger. <http://www.cartercenter.org/countries/niger-health-trachoma.html>

⁵⁸Trachoma Atlas.Niger Country Data. <http://www.trachomaatlas.org/maps/niger>

⁵⁹End in Africa. 2012. Control of Neglected Tropical Diseases: Annual Workplan October 2011- September 2012. Rev 2. <http://endinafrica.org/wp-content/uploads/2012/11/Niger-NTD-Work-Plan-FY2012.pdf>

⁶⁰RTI International. 2012. Neglected Tropical Disease Control Program Final Report. http://www.rti.org/pubs/NTDCP_FINAL_REPORT_lo_res.pdf

Technical and Financial Partners

Organization	Activity	Geographic Region
USAID NTD Control Program 2007–2012 RTI + Partners ⁶¹	<ul style="list-style-type: none"> • Mapped trachoma • MDA for LF, schistosomiasis, and trachoma • Built capacity of NTD Task Force • Developed IEC tools • Conducted trachoma impact surveys (showed <10% in 18 districts); now biannual PZq treatment to replace annual MDA except in 10 hyper-endemic regions (Tillabery, Dosso, Niamey) 	Dosso, Maradi, Niamey, Tillabery, Tahoua
Helen Keller International—Trachoma ⁶²	<ul style="list-style-type: none"> • Trains trichiasis operators to perform surgery • Distributes antibiotics • Establishes mobile screening and surgical camps in hard to reach areas • Supports rural radio awareness campaigns • Trains teachers on hygiene • Advocates for hygiene education in schools 	Diffa, Dosso, Zinder
International Trachoma Initiative ⁶³	<ul style="list-style-type: none"> • Since 2002 received more than 37 million Zithromax treatments • In 2011, target nearly 8 million people for treatment 	Diffa, Dosso, Maradi, Tahoua, Zinder
Carter Center—Trachoma	See WASH-NTD integration section	Diffa, Maradi, Zinder
USAID END in Africa—STH, Schistosomiasis and Trachoma ⁶⁴	<ul style="list-style-type: none"> • Supports the planning process of the national program for the fight against NTDs • Conducts mapping • Conducts mass drug administration • Supports supply chain management 	Countrywide
FHI 360 and partners		

⁶¹RTI International. 2012. Neglected Tropical Disease Control Program Final Report. http://www.rti.org/pubs/NTDCP_FINAL_REPORT_lo_res.pdf

⁶²Helen Keller International. Niger Country Page. <http://www.hki.org/working-worldwide/africa/niger/>

⁶³International Trachoma Initiative. Niger at a Glance. <http://trachoma.org/niger/>

⁶⁴End in Africa. 2012. Control of Neglected Tropical Diseases: Annual Workplan October 2012 – September 2013. <http://endinfrica.org/wp-content/uploads/2013/01/Niger-NTD-Workplan-FY2013.pdf>

WASH Landscape

Increasing access to improved water supplies is a priority for the Government of Niger as referenced in key policy documents, including the Accelerated Development and Poverty Reduction Strategy (SDRP) and the Rural Development Strategy (RDS).⁶⁵ *The Code de l'Eau* (National Water Law) includes the human right to water and provides the legal basis for regulating the country's water resources. Although the National Water Law decentralized the responsibility for water and sanitation service provision to the communes, decentralization is moving slowly and few communes have the capacity to carry out this mandate.

The major policy documents for the WASH sector are: the National Drinking Water Supply and Sanitation Programme (PNAEPA 2011–2015) and the Strategy to Promote Hygiene and Basic Sanitation (2012). The government of Niger addresses urban and rural water supply and sanitation (WSS) sector separately.⁶⁶ The various government ministries involved in the WSS sector coordination are:

- The newly created Ministry of Water and Environment oversees all water supply activities, supply of sanitation services in rural areas, and inter-ministerial and sectoral coordination.
- The Ministry of Public Health is responsible for urban sanitation, personal hygiene, and public health education.
- The Ministry of Education ensures sanitation and hygiene education in schools.

In 2010, the National Commission for Water and Sanitation was subsumed into the Alliance of WASH Resources Centers (ACR-WASH) hosted by CREPA (Centre Régional pour l'Eau Potable et l'Assainissement), the organization that coordinates knowledge management for the sector.⁶⁷

Notable Ongoing WASH Initiatives

It is not uncommon for women to walk an average distance of 10 kilometers daily to get clean water in rural Niger.⁶⁸ Internal conflict and periodic droughts further impact the availability of safe water. Most development initiatives in Niger focus on food security and natural resource management. WASH is typically an important component of these programs, but rarely the primary focus. Below are some notable WASH initiatives ongoing in Niger.

⁶⁵ Agence Française de Développement. Favoriser l'accès à l'eau. <http://www.afd.fr/home/pays/afrique/geo-afr/portail-niger/nos-projets/projets-eau-niger>

⁶⁶ USAID. 2010. Niger Water Sanitation Profile. <http://www.washplus.org/sites/default/files/niger.pdf>

⁶⁷ Water Supply & Sanitation Collaborative Council. Niger: Wash Sector at a Glance. <http://www.wsscc.org/countries/afrique/niger/wash-sector-glance>

⁶⁸ Water Aid Global. Where we Work: Niger. <http://www.wateraid.org/where-we-work/page/niger>

Organization	Activity	Geographic Region
West Africa Water Supply, Sanitation and Hygiene Initiative (WA-WASH) ⁶⁹ (2011–2015)	<ul style="list-style-type: none"> • Builds on and expanding past WAWI efforts in West Africa • Implements technologies and procedures to help increase access to safe water, enhance sanitation, and improve hygiene • Assists government in policy-making 	N/A
Paseha: Water & Sanitation Support Program (Phase 2) ⁷⁰ 2012–2016	<ul style="list-style-type: none"> • Rehabilitates and constructs water points • Supports institutional reforms • Promotes hygiene and sanitation for 500,000 	Zinder, Diffa
UNICEF ⁷¹	<ul style="list-style-type: none"> • Trains government volunteers from the targeted communities on community led total sanitation (CLTS) 	N/A
Kantche MDG Project ⁷² 2011–2014	<ul style="list-style-type: none"> • Improves household sanitation • Improves drinking water facilities • Provides hygiene education • Conducts mass media campaigns 	Kantché (Zinder region)
WaterAid ⁷³	<ul style="list-style-type: none"> • Develops plans to improve local water, sanitation, and hygiene services for poor • Designs and manages sustainable water points and sanitation options • WASH in Schools • CLTS and household latrine construction • Constructs and rehabilitates boreholes and hand-dug wells 	Maradi, Dosso, Zinder, Tillabéri, and Tahoua.
World Vision ⁷⁴	<ul style="list-style-type: none"> • Boreholes 	N/A

⁶⁹Perez, Evelyn. GLOWS Launches Clean Water Program in West Africa. *FIU News*.

<http://news.fiu.edu/2011/10/gloWS-launches-clean-water-program-in-west-africa/32450>

⁷⁰Danida. 2011. Consultancy services for sector support programme for water, hygiene and sanitation, Phase 2, 2012-2016, (Paseha 2). <http://um.dk/en/danida-en/activities/business/contracts/long/contract-opportunities/newsdisplaypage/?newsid=b0287f74-b7a1-4ce7-8099-f394098e3996>

⁷¹Unicef. 2011. In Niger, New Sanitation Programme is Transforming Lives Through Better Hygiene. http://www.unicef.org/infobycountry/niger_57677.html

⁷²Water and Sanitation for Africa. The Kantche MDG project – Niger. <http://www.wsafrica.org/welcome/projects/kantche-mdg-niger.aspx>

⁷³Water Aid Global. Where we Work: Niger. <http://www.wateraid.org/where-we-work/page/niger>

⁷⁴World Vision. 2012. Niger. <http://www.worldvision.org/our-work/international-work/niger>

CARE ⁷⁵	<ul style="list-style-type: none"> • Integrated Water Resource Management program • Wells for Peace 	Lower Tarka River Basin, Diffa
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Integrated WASH-NTD Initiatives

The following initiatives have both a WASH and an NTD component:

Organization	Activity	Geographic Region
West Africa Water Initiative (WAWI) (ended 2007)	<ul style="list-style-type: none"> • Rehabilitated or dug wells • Constructed latrines • Increased hand and face washing (limited data) 	N/A
The Carter Center ⁷⁶	<ul style="list-style-type: none"> • Uses SAFE strategy • Built latrines; trained masons (10,000+ latrines built in 2012) • Supports health education through radio/listening clubs • Trained religious and community leaders • Trained school teachers (with HKI) • Directed media on hygiene • Developed soap making as income generating projects for women 	Maradi, Diffa, and Zinder
USAID NTD Control Program 2007–2012	<ul style="list-style-type: none"> • Developed IEC materials with joint messages for schistosomiasis and trachoma 	N/A
RTI + Partners		

Discussion and Opportunities

The abysmal disease and WASH coverage statistics make Niger a prime country to target for WASH-NTD integration. Several WASH and NTD programs exist or have recently ended throughout the country. The government of Niger has established coordination mechanisms for NTDs and for WASH. Whether communication occurs between these two entities is unclear, however, a joint NTD-WASH task force could be initiated to begin discussing and planning how best to integrate WASH activities that will assist in reducing STH, schistosomiasis, and trachoma.

NTD programs with WASH-specific activities have been tried in Niger, most notably by the Carter Center, though it is unclear how successful or sustainable they have been. Most integration efforts target trachoma and seem to be focused at improving hygiene and sanitation behaviors the school and community levels. Integrated information, education, and communication (IEC) materials exist that

⁷⁵Care. Countries: Africa. <http://water.care2share.wikispaces.net/Countries#AFRICA-Niger>

⁷⁶Carter Center. Fighting Disease: Niger. Controlling Trachoma. <http://www.cartercenter.org/countries/niger-health-trachoma.html>

include WASH actions and highlight MDA as an NTD control strategy. These could be reviewed, updated, and distributed more widely in endemic areas along with appropriate training for teachers and other relevant leaders.

WASHplus resource partners CARE and WaterAid have WASH activities in NTD endemic regions. CARE has projects in Diffa and Maradi while WaterAid is in Zinder, Maradi, Tahoua, Tillaberi, and Dosso. Piloting a WASH/NTD-focused intervention is feasible in these regions. Colleagues from the Taskforce on Global Health, Children without Worms, and International Trachoma Initiative are interested in collaborating with WASHplus on a country assessment in Niger.

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Mozambique Country Profile

Background

Mozambique is located in southern Africa, vulnerable to frequent flooding and droughts, and reliant on upstream neighbors for 50 percent of its surface water.⁷⁷ Ranked 185 out of 186 countries on the Human Development Index, Mozambique has one of the lowest levels of access to safe water in the world, coupled with a growth rate that exceeds other African countries at 8 percent per year. Mozambique has 11 provinces and 128 districts. According to WHO, roughly 16.2 percent of all deaths in Mozambique can be attributed to inadequate water, sanitation and hygiene (WASH) practices.⁷⁸ Poor access to water and sanitation is a major barrier to growth and development. Urban populations have more access to safe water (77%) and sanitation (38%) than do rural populations (29% and 5% respectively).⁷⁹

The country is highly endemic for all three target neglected tropical diseases: soil-transmitted helminthiasis (STH), schistosomiasis, and trachoma. The Ministry of Health (MISAU) has implemented NTD programs since 2009 and has developed an ambitious scale-up plan to fully cover all districts where infection levels require mass drug treatment.

NTD Landscape

The National NTD program in Mozambique began in 2009. The MISAU's draft National Action Plan for Prevention and Control of Neglected Tropical Diseases 2013–2017 currently guides the control, elimination and eradication of NTDs. Under the coordination of the National Directorate of Public Health (Department for Other Contagious Diseases) each province plans and coordinates the implementation of control activities. The provincial representative coordinates activities at that level and acts as an intermediary body between the district and national levels.⁸⁰

Burden of Disease

Soil-transmitted Helminthiasis (STH)

STH is present throughout all of the 128 districts in Mozambique. The most affected provinces are Niassa, Cabo Delgado, Nampula, and Zambezia, located in northern and central regions of the country. To date, more than 90 percent of children <5 years of age undergo anti-parasitic treatment twice a year. Approximately 3 million children ages 1–4 and 6.4 million children ages 5–14 are being targeted for STH preventive chemotherapy.⁸¹

Schistosomiasis

The prevalence of schistosomiasis *haematobium* varies from 12.3 percent to 81.3 percent with an estimated 18.7 million people requiring treatment.⁸² The most endemic provinces are Niassa, Cabo

⁷⁷ USAID. 2010. Mozambique Water and Sanitation Profile.

⁷⁸ <http://www.oecd.org/countries/mozambique/49295401.pdf>; More than Water: Impact Evaluation of drinking water supply and sanitation interventions in rural Mozambique

⁷⁹ JMP UNICEF/WHO Progress on Drinking Water and Sanitation, 2012 Update

⁸⁰ USAID/ENVISION FY13 workplan Mozambique October 2012 – September 2013

⁸¹ USAID/ENVISION FY13 workplan Mozambique October 2012 – September 2013

⁸² ENVISION, 2012. Mozambique Work plan FY 2013, October 2012 – September 2013

Delgado, Nampula, and Zambezia. The Ministry of Health considers all of the Mozambican population at risk of Schistosomiasis infection.⁸³

Trachoma

No population-level data exist to estimate treatment numbers because trachoma mapping is incomplete. Provincial-level (“super-district”) mapping was carried out in three provinces (Niassa, Cabo Delgado, and Inhambane) in 2011, which revealed a prevalence of TF > 10 percent in more than half of the communities surveyed.⁸⁴ Helen Keller Institute (HKI) references a “recent” survey from northern Mozambique that found as many as 32 percent of children under 9 years old with active infection.

Major NTD Implementing Partners

Organization	Activity	Geographic Region
ENVISION in coordination National Directorate for Public Health	<ul style="list-style-type: none"> Assists national NTD program to develop and implement NTD National Steering Committee Second NTD Logistics Officer to MISAU for drug logistics and supply chain mgmt. 	<ul style="list-style-type: none"> National
USAID (RTI)	<ul style="list-style-type: none"> Maps trachoma in Cabo Delgado and Zambezia Conducts MDA of Zithromax and tetracycline for trachoma in Niassa 	<ul style="list-style-type: none"> Cabo Delgado Zambezia Niassa
2013–2017	<ul style="list-style-type: none"> Strengthens data collection systems and M&E of NTD activities 	
HKI	<ul style="list-style-type: none"> Maps trachoma 	<ul style="list-style-type: none"> Manica
2011	<ul style="list-style-type: none"> Partners with schools to identify and control trachoma in communities and schools 	<ul style="list-style-type: none"> Niassa Cabo Delgado

WASH Landscape

The water supply sector has progressed successfully in urban areas starting with the 1995 National Water Policy that introduced key reforms, such as increased private sector role, and applied a demand-response approach to service provision. The 1997 Decentralization Law helped to create autonomous municipal governments, regulatory bodies, and so on. Four cities—Beira, Pemba, Quelimane, and Nampula—have achieved an almost continuous water supply as a result of private sector participation. In contrast, rural areas have not been well served. The 2007 National Rural Water and Sanitation Strategic Plan lacks a clear strategy, has limited capacity, and relies heavily on donors.

http://www.ntdenvision.org/sites/default/files/docs/py13_envision_wp_mozambique_web.pdf

⁸³ <http://www3.imperial.ac.uk/schisto/wherewework/mozambique/mozambiquestrategy>

⁸⁴ Ibid.

The Ministry of Public Works and Housing is the lead agency for water and sanitation, with the National Directorate of Water the sectoral focal point. At the provincial level, the 10 Provincial Directorates of Water manage rural provision with oversight from the DNA.⁸⁵ Sector Working Group (GAS) is co-chaired by the government and UNICEF and attended by key sector nongovernmental organizations (NGOs).⁸⁶

Sixty-two percent of the population lives in rural areas with limited access to improved water sources. Rural water points are largely managed by community groups that support small piped village systems and boreholes with hand pumps. The World Bank estimates that 35 percent of these systems do not work at any given point in time.

Mozambique does not have a national hygiene program. Attitudes about health and hygiene are not well understood and hygiene behavior change is not well monitored. A UNICEF report found that while 90 percent of surveyed respondents reported hand washing at critical times, only 1 percent actually did so correctly under running water with a cleaning agent.⁸⁷

According to a WASH Sector Brief,⁸⁸ the sanitation subsector (both urban and rural) has lagged because of fragmented leadership, lack of government demand and damage from the 1982–1992 internal conflict. Rural sanitation has suffered the largest gap in financing despite a national policy and targets. According to the Water and Sanitation Program (WSP), the current sanitation investment in Mozambique is less than 0.1 percent of GDP yet poor sanitation costs the government 4 billion Mozambican Meticals (USD 124 million) each year, which underestimates the true cost.⁸⁹ The African Ministers' Council on Water *Country Status Overview: Turning Finance into Services for 2015 and Beyond*, states a clear key need to prioritize rural sanitation with a focus on total sanitation and sanitation marketing approaches and engaging both public and private sectors. In rural areas within Mozambique's central provinces, community-led total sanitation (CLTS) is gaining momentum.

Major WASH Players

Mozambique has invested significantly in WASH activities through government and donor funds. The following highlights some major ongoing WASH activities in Mozambique. Two WASHplus partners—CARE and WaterAid—have longstanding investments in the sector.

⁸⁵Institute for Sustainable Futures (ISF) at the University of Technology in Sydney

⁸⁶<http://www.gas.org.mz/>

⁸⁷UNICEF Mozambique Water, Sanitation and Hygiene Survey.

⁸⁸Institute for Sustainable Futures (ISF) at the University of Technology in Sydney

⁸⁹ The adverse impact of unsafe excreta disposal on water resources is not included in the cost estimation as figures are not available for Africa (Economic Impacts of Poor Sanitation in Africa, WSP, March 2012).

Organization	Activity	Geographic Region
WaterAid 2002–Present	<ul style="list-style-type: none"> • Strengthens district-based government departments and local NGOs • Pilots use of rope pumps and composting latrines 	<ul style="list-style-type: none"> • Majune, Nipepe, Mecanhelas Districts, Niassa • Pebane, Nicoadala, Namacurra Districts, Zambezia • Maua, Nampula • Maputo (5 bairros)
Save the Children Since 1992	<ul style="list-style-type: none"> • Conducts community mobilization and builds capacity to provide and maintain child-friendly latrines and urinals, water pumps and hand washing facilities in schools • Supports the FRESH M&E Framework 	<ul style="list-style-type: none"> • 20 years in Manjacaze, Chibuto Bilene, Xai-Xai Districts, Gaza • Shifted to Nampula in 2012
CARE	<ul style="list-style-type: none"> • Promotes local water management • Implements sanitation programs • Implements hygiene programs 	<ul style="list-style-type: none"> • Nampula • Inhambane • Cabo Delgado • Maputo
Plan International	<ul style="list-style-type: none"> • Builds and equips five schools with sanitary facilities 	<ul style="list-style-type: none"> • Inhambane • (5 communities)
UNICEF, World Vision, Ministry of Public Works and Housing 2006–Present \$31Million	<ul style="list-style-type: none"> • One Million Initiative: safe water and sanitation to 1.2 million people • Rehabs or constructs low-cost WASH facilities in communities and health facilities • Trains on safe hygiene • Installs or rehabs school water supply systems and separate latrines for boys and girls • Conducts CLTS • Provides technical assistance to government to develop pro-poor sectoral policies and decentralized planning 	<ul style="list-style-type: none"> • 18 districts in • Manica • Sofala • Tet
IRC 2002–Present (WASHCost 2009–2016) €500,000	<ul style="list-style-type: none"> • Supports WASH in country over long term • Researches the actual costs of indefinite WASH services (WASHcost) 	National

Millennium Challenge Corporation WASH project	<ul style="list-style-type: none"> • Builds capacity of local institutions and policy development • Supports water supply and sanitation services in target areas 	<p>Six cities in</p> <ul style="list-style-type: none"> • Zambezia • Nampula • Cabo Delgado
2008–Present		
\$204 million		<p>Two mid-sized towns and rural water supply services in</p> <ul style="list-style-type: none"> • Nampula • Cabo Delgado
WSP	<ul style="list-style-type: none"> • Provides technical assistance to rehab piped water systems in two large towns stimulating private sector participation 	<ul style="list-style-type: none"> • Two large towns
Current	<ul style="list-style-type: none"> • Works with government to develop national platform for urban sanitation • Supports fecal sludge management for urban slums 	<ul style="list-style-type: none"> • Maputo
\$15 million	<ul style="list-style-type: none"> • Supports rural water supply and sanitation (through combined grant/loan) 	<ul style="list-style-type: none"> • Nampula • Zambezia
African Development Bank		
2010–Present		
€28 million		
World Bank	<ul style="list-style-type: none"> • Provides loan to strengthen management of national water resources 	<ul style="list-style-type: none"> • National
2012–Present		
\$50 million		

Integrated WASH/NTDs Initiatives

No integrated programs were identified.

Discussion and Possible Opportunities

In general it seems that the WASH landscape in Mozambique is not well organized or focused on expanding rural water and sanitation services, which could make this a difficult country in which to work. Yet, the high burdens for all three diseases in the north and central parts of the country coupled with the low WASH coverage rates in rural areas speaks to the great need for services that could address both NTD and WASH outcomes. Though still insufficiently documented, the prevalence of trachoma in the northern provinces (and possibly in other areas) could be reduced with a holistic implementation of the Surgery, Antibiotics, Face Washing, and Environmental Sanitation (SAFE) strategy.

Four provinces in Mozambique are endemic with STH, schistosomiasis, and trachoma and have the greatest need for rural WASH services:

1. Niassa in the northeast is sparsely populated with one million people in 15 districts.
2. Cabo Delgado, the northernmost province has 16 districts, three municipalities, and a population of 1.6 million.
3. Nampula, in the north, has 18 districts plus five municipalities, and a population of 3.9 million.
4. Zambezia, in the central coastal region, has 16 districts, one municipality, and a population of 3.85 million.

Mozambique is a country of interest to the Global Health Taskforce, International Trachoma Initiative, and Children without Worms. In addition, CARE is a core WASHplus partner—with activities in Nampula and Cabo Delgado—that is interested in WASH-NTD programming.

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Ghana Country Profile

Background

Ghana is a lower middle income country in West Africa with approximately 25 million people, 52 percent of whom live in urban areas.⁹⁰ Administratively, Ghana is divided into 10 Regions and 216 Districts. It ranks 135 of 186 countries on the Human Development Index.⁹¹ Most development indicators, including Gross National Income per capita, Gross National Product, and life expectancy have increased markedly over the past decade. Under-five mortality rate decreased from 111 per 1,000 live births in 2003 to 80 per 1,000 live births in 2008.⁹² Despite this decline, 1 in every 13 Ghanaian children dies before reaching the age of 5. Twenty percent of children under 5 had diarrhea in the 2 weeks preceding the 2008 Demographic Health Survey. Not surprisingly, diarrhea prevalence is lowest among children who live in households with improved, not shared toilet facilities, and highest among children residing in households without improved source of drinking water.⁹³ The Joint Monitoring Programme (JMP) reports that 80 percent of households in Ghana have access to an adequate water source, while only 8 percent have access to improved, non-shared sanitation facilities.

All three neglected tropical diseases highlighted in this review are endemic in Ghana. WHO, however, does not consider soil-transmitted helminthes a grave problem. Schistosomiasis, on the other hand, is present at levels of medium to high intensity nationwide. Finally, Ghana is on the brink of eliminating trachoma.

NTD Landscape

The Government of Ghana has made significant progress in controlling NTDs. Mass drug administration (MDA) for onchocerciasis started as early as 1999 and integrated MDAs started in 2007.

Burden of Disease

Soil-transmitted helminthiasis (STH)

STH is not considered a public health problem in Ghana. Nevertheless, the Ministry of Health provides treatment to school aged children in most districts.

Schistosomiasis

A country-wide mapping of schistosomiasis undertaken in 2008 confirmed that all districts in Ghana are endemic. Thirty-seven of 170 districts are considered to be hyper-endemic, characterized by a prevalence equal or above 50 percent. Among the remaining districts, 109 have prevalence between 10–49 percent and 24 have prevalence below 10 percent. In general, the hyper-endemic areas are in the southern part of the country, concentrated in areas with extensive amounts of surface water (lakes, rivers, and streams). The first MDA for schistosomiasis started in 2008 and continues annually in schools and communities. Ghana targets school-age children in a national schistosomiasis treatment campaigns that began in 2009.

⁹⁰JMP Ghana country report.

⁹¹Human Development Report 2013. The Rise of the South: Human Progress in a Diverse World. UNDP, 2013.

⁹² Ghana Demographic Health Survey ([http://www.measuredhs.com/pubs/pdf/FR221/FR221\[13Aug2012\].pdf](http://www.measuredhs.com/pubs/pdf/FR221/FR221[13Aug2012].pdf))

⁹³ Ibid.

After three years of consecutive MDA campaigns, END in Africa postponed MDA for schistosomiasis in 2012, but is expected to continue providing treatment in all districts in 2013.

Trachoma

Ghana is on the verge of trachoma elimination. If confirmed, Ghana would be the first county in sub-Saharan Africa to do so. Trachoma is endemic only in the northern regions of the country, areas that are less densely populated than the southern coast in and around the capital, Accra.

Major Players

Health management in Ghana is decentralized within the Ghana Health Service (GHS) that operates within the Ministry of Health. In 2007, the GHS developed a Neglected Tropical Diseases Control Program (NTDCP) that seeks to bring five NTDs, including the three that are the focus of this study, under control before 2015. In addition to MDA, the strategy calls for training on NTD prevention be provided to community based volunteers, environmental health officers, teachers to lead community based social awareness campaigns.

The NTDCP calls for the development of strategic plans for each of the five diseases, though this desk study was unable to verify the existence of these plans. National NTD coordination and planning meetings are scheduled each November/December. Similar meetings at the Regional and District levels are also organized.

The NTD programs fall under the Division of Public Health within the GHS. Ghana does not have a coordination structure platform specific for NTDs and effective coordination at the national and decentralized levels has proven difficult at times. Funding for NTD control programs and MDA is insufficient to cover all 10 regions. Treating out of school children is a problem especially for schistosomiasis and STH.⁹⁴

Major NTD Implementing Partners

Organization	Activity	Geographic Region
USAID/END in Africa	Highlights of the program include:	N/A
FHI 360 and Catholic Relief Services	<ul style="list-style-type: none"> Manages community-based MDA for STH, schistosomiasis Finalizes NTD Master Plan for Ghana for 2011–2015 in collaboration with WHO and share with stakeholders Supports Task Force (TF) surveillance activities in 29 districts where blinding trachoma has been eliminated Develops a supply chain management strategy to 	

⁹⁴ Biritwum, Nana-Kwadwo: Opportunities and Challenges NTD Control in Ghana, PowerPoint presentation

	monitor NTD drugs and logistics, and takes steps to implement the strategy	
	<ul style="list-style-type: none"> • Strengthens M&E at all levels of the program; holds monthly TF meetings 	
Centre for Neglected Tropical Diseases	<ul style="list-style-type: none"> • Led the Filariasis Elimination Programme (2001–2008) 	N/A
Liverpool School of Tropical Medicine		
International Trachoma Initiative (ITI)	<ul style="list-style-type: none"> • Works to eliminate the backlog of trichiasis cases requiring surgery • Supports the MOH screen cases of active trachoma 	Upper West and Northern Regions

Rural WASH Landscape

In Ghana, rural water supply and sanitation are under the auspices of the Community Water and Sanitation Agency (CWSA) that operates under the Ministry of Water Resources, Works and Housing. The CWSA effectively serves the function as the regulator for water and sanitation services in rural areas and has representation each of Ghana’s 10 Provinces. Key functions of the CWSA include but are not limited to⁹⁵

- Support district assemblies to promote sustainable safe water supply and sanitation services in rural communities and small towns; encourages communities to design, plan, construct, and manage water and sanitation projects
- Formulate strategies to mobilize safe water development and related sanitation programs
- Coordinate nongovernmental organizations (NGOs) engaged in WASH sector in rural communities and small towns

Having made steady progress in increasing access rates to improved water supplies in rural areas over the past 10 years, Ghana now reports an 80 percent coverage rate and is on track to achieve the MDG for rural water supply. As in most other sub-Saharan African countries, Ghana faces challenges with rural water system sustainability. The actual functionality and reliability of systems is likely significantly lower than the JMP coverage rate.

Although progress in water supply is encouraging, the JMP reports that only 10 percent of the country has access to improved sanitation. As in other countries, community-led total sanitation (CLTS) is a common approach promoted by the government to end open defecation in rural communities. These efforts are

⁹⁵<http://www.cwsagh.org/>

largely not reflected in the JMP indicators because the latrines do not meet the JMP definition for an improved toilet.

The Coalition of NGOs in Water and Sanitation (CONIWAS) is a national networking and coordination body of over 50 members working on issues related to managing water resources, providing sustainable water and sanitation services, and promoting hygiene in Ghana. Established in 2003, CONIWAS meets annually and provides a platform of exchange for WASH sector NGOs to engage with the government and other and private sector organizations.⁹⁶

Other WASH Players

Organization	Activity	Geographic Region
West Africa Water, Sanitation and Hygiene (WA-WASH): (2011–2015)	<ul style="list-style-type: none"> Support CLTS, hygiene promotion, school WASH Improve sanitation marketing efforts Build technical capacity in WASH 	<ul style="list-style-type: none"> Upper West, Upper East, Northern, Greater Accra, Eastern, Volta, Central
Ghana Water, Sanitation and Hygiene Project	<ul style="list-style-type: none"> Increases access to improved water and sanitation facilities Empowers individuals and communities to adopt positive WASH practices 	<ul style="list-style-type: none"> Western Central
Relief International	<ul style="list-style-type: none"> Strengthens capacity of community and district-level workers to plan and manage WASH programs Enhances Ghanaian private WASH providers to respond to the market and provide needed services 	<ul style="list-style-type: none"> Greater Accra Volta Eastern
Enhanced WASH Services in Schools and Communities in Ghana	<ul style="list-style-type: none"> Delivers water, basic WASH services to 150 primary and junior high schools and communities in 10 districts 	N/A
UNICEF		
Varied small projects	<ul style="list-style-type: none"> Increases access to improved water supply and sanitation 	<ul style="list-style-type: none"> Various areas
WaterAid, CRS, World Vision, Water.org		

⁹⁶<http://www.coniwas.org/>

The Ministry of Education's (MOE) Education Strategic Plan (ESP) 2010-2020 explicitly mentions increasing access to WASH services at schools. The School Health Education Programme (SHEP) unit within the Ministry of Education is responsible for coordinating WASH in School efforts. Illustrative activities undertaken by SHEP in 2012 include: promoting hand washing with soap, developing standard strategy and guideline documents required for WASH in Schools programming, and establishing a Sanitation and Hygiene sub-committee.⁹⁷ The SHEP Unit collaborates closely with the Environmental Health and Sanitation Directorate of the Ministry of Local Government and Rural Development in most initiatives.

Integrated WASH-NTD Initiatives

The Ghana Trachoma Control Program reduced the prevalence of active trachoma from 9.7–16.1 percent to less than 3.0 percent in endemic districts between 2000 and 2010.⁹⁸ The program brought together government, donor, multilateral, and international and local NGO actors, to ensure the full implementation of the preventive aspects of the SAFE strategy alongside the treatment elements.⁹⁹

WaterAid Ghana shifted to new districts to align with the objectives of the program. Interventions included WASH in schools, CLTS, and hygiene promotion by community health workers, volunteers, and mass media broadcasting. This experience provides valuable lessons on coordinated approaches to disease prevention.

A multi-year evaluation of the effectiveness of a water recreation area (WRA) designed to prevent schistosomiasis transmission to school-aged children in a rural Ghanaian community of 2,000 residents concluded that the installation and use of a WRA is a feasible and highly effective means to reduce incidence of schistosomiasis in school-aged children. In conjunction with drug treatment and education, such an intervention could represent a significant step toward controlling schistosomiasis.¹⁰⁰

Discussion and Opportunities

Ghana's success in implementing the SAFE strategy to bring the country close to trachoma elimination is to be commended and lessons learned from Ghana's experience should be disseminated to countries still years away from controlling trachoma.

Of the three NTD's explored here, schistosomiasis offers the clearest opportunity for NTD/WASH sector collaboration in Ghana. The combination of endemic areas and rural sanitation coverage being so poor offers a unique opportunity to develop and test the effects that improved household-level sanitation and hygiene behaviors have on the disease. A generic monitoring protocol could be designed to incorporate

⁹⁷School Health Education Programme Unit, Ghana Education Service, 2012 Annual Report

⁹⁸The elimination of Blinding Trachoma in Ghana through improving access to water and latrines (2011)

⁹⁹ The partnership included the Ministry of Health, Ghana Health service, Community Water and Sanitation Agency, District Assemblies, Ministry of Education, , Ministry for Women and Children's Affairs, CBM, CRS, DANIDA, ITI/Pfizer, RTI/USAID, Operation Eye Sight Universal, Sightsavers, Swiss Red Cross, The Carter Centre UNICEF, WaterAid, and World Vision. New Energy and ProNet WHO.

¹⁰⁰ Effective Control of Schistosoma haematobium Infection in a Ghanaian Community following Installation of a Water Recreation Area

testing for schistosomiasis before and after engaging in a CLTS, sanitation marketing, or WASH in schools campaign.

The WASH in Schools coordination unit of the MOE is unique to the countries profiled in this study. This body may offer a platform through which to integrate information, education, and communication (IEC)/behavior change communication materials about the transmission and prevention of schistosomiasis into school WASH curricula currently under development. The school-based MDA for schistosomiasis organized by the END in Africa program are a possible bridge to a greater presence from NTD prevention in WASH in Schools.

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<http://www.wateraid.org/~media/Publications/national-water-sector-assessment-ghana.pdf>

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Senegal Country Profile

Background

Senegal is a nation with 700 km of coastline on the most western edge of Africa. Senegal is organized administratively into 14 regions with 75 health districts.¹⁰¹ The country has a population of 12.5 million, 50 percent of whom are under 20 years old and 68 percent of whom live in rural areas.¹⁰² Senegal's position bordering the Sahel has led to frequent droughts. High rural poverty and limited access to rural infrastructure and basic services have fueled migration to urban areas.¹⁰³ Senegal ranks 154 out of 186 in the Human Development Index.¹⁰⁴

Compared to other African countries, Senegal's population has a high level of access to water and sanitation. Senegal is on track to meet its Millennium Development Goal 7 (MDG 7) targets: 90 percent of the population with access to safe drinking water and 67 percent with sustainable access to sanitation.¹⁰⁵ Rural populations are less well served than urban populations: in 2010, 39 percent of the rural population used improved sanitation facilities¹⁰⁶ and 56 percent used improved sources of drinking water.¹⁰⁷ Senegal is affected by all three NTDs discussed in this review: soil-transmitted helminthiases (STH) and schistosomiasis are endemic nationwide and trachoma is endemic in 13 districts within the regions of Louga, Kaffrine, and Kaolack.¹⁰⁸

NTD Landscape

Burden of Disease

Soil-transmitted Helminthiases (STH)

STH is believed to be endemic throughout Senegal, though mapping has only been completed in 16 health districts in 3 regions: Saint Louis, Tambacounda, and Matam in the extreme north and east of the country. The WHO survey conducted in 2010 in these 3 regions reported an overall prevalence of 21.9 percent. Saint Louis recorded the highest level of infection with a prevalence rate of 28.6 percent. Rates observed in Tambacounda and Matam were 14.1 percent and 18.5 percent respectively. In 2011, approximately 5.2 million students received preventive chemotherapy for STH.¹⁰⁹

¹⁰¹ PLAN Directeur De Lutte Integree Contre Les Maladies Tropicales negligees 2011–2015

¹⁰²WHO. 2010. Global Health Observatory Data Repository: Senegal Statistics Summary (2002-present).

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¹⁰³World Banks. 2012. Senegal Overview. <http://www.worldbank.org/en/country/senegal/overview>

¹⁰⁴UNDP. 2013. International Human Development Indicators.

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¹⁰⁵USAID. 2010. Senegal Water Sanitation Profile. <http://www.washplus.org/sites/default/files/senegal2010.pdf>

¹⁰⁶WHO/UNICEF. 2012. Joint Monitoring Program for Water and Sanitation. Estimates for the use of Improved Sanitation Facilities: Senegal.

¹⁰⁷WHO/UNICEF. 2012. Joint Monitoring Program for Water and Sanitation. Estimates for the use of Improved Drinking Water Sources: Senegal.

¹⁰⁸WHO 2008.Senegal Country Profile.

http://www.who.int/neglected_diseases/preventive_chemotherapy/databank/CP_2008_Senegal.pdf

¹⁰⁹WHO. 2012. Soil Transmitted Helminthiases: Number of Children (Pre-SAC and SAC) Requiring Preventive Chemotherapy forSoil Transmitted Helminthiases, 2011. http://apps.who.int/neglected_diseases/ntddata/sth/sth.html

Schistosomiasis

Schistosomiasis is endemic in all regions in Senegal—though the capital, Dakar, is not considered at risk because it lacks favorable environmental factors necessary to spread the disease. The most affected regions are those of Tambacounda, Saint Louis, and Diourbel Fatick with prevalence's ranging from 9.8 to 39.4 percent. The intensity of schistosomiasis infection is highest along the Senegal River valley, including Lake Guiers, in the western region of Cap Vert Thiès, Dioubel, Sine Saloum, Senegal Oriental, and Casamance.¹¹⁰ The damming of rivers for agriculture has increased the prevalence of infection in the past decade. Mapping of schistosomiasis is completed in 58 regions and is scheduled in 13 more.

Trachoma

Since 2004 Senegal has implemented the SAFE strategy and strives to eliminate trachoma by 2015.¹¹¹ The International Trachoma Initiative has identified nearly 2.6 million people at risk and 91,500 people living with trachoma. Trachoma is endemic in 13 districts, 6 of which received Zithromax in 2011.¹¹²

Government Coordination¹¹³

The National Health Development Plan 2009–2018 (NHDP) discusses NTD management. The Plan highlights success: the country is guinea worm free and onchocerciasis is no longer a public health problem. The government is strengthening epidemiological surveillance especially among communities and has been working to control trachoma with mass treatment with azithromycin and strichiasis surgery since 2004 in the priority areas. In addition to address schistosomiasis, the campaigns of mass treatment with Praziquantel were initiated under Project Fight against Endemic Diseases since 1997.

In the NHDP, strengthening the fight against NTDs in an integrated manner based on local capacities strengthened is one of the eleven strategic directions. The Government of Senegal plans to leverage the community experiences in surveillance of onchocerciasis and guinea worm to initiate new community approaches, especially in controlling schistosomiasis.

Senegal, like other members of the African Region of WHO, adopted the regional strategy for integrated disease surveillance. The system will be set up to integrate harmoniously in the existing surveillance systems for specific needs related to the management of certain programs to fight against the disease. Diseases targeted by the system are those that have epidemic potential—diseases that are subject to program control, eradication, and elimination.

¹¹⁰International Association for Medical Assistance to Travelers. 2012. World Schistosomiasis Risk Chart. http://www.iamat.org/pdf/World_Schistosomiasis_Risk_Chart.pdf

¹¹¹Trachoma Atlas.Senegal Country Data http://www.trachomaatlas.org/maps/search/all?country=175&map_type=All&infection=All

¹¹²International Trachoma Initiative. Senegal at a Glance. <http://trachoma.org/senegal#>

¹¹³Republic of Senegal Ministry of Health and Prevention. 2009. National Health Development Plan (PNDS) 2009-2018.

http://www.internationalhealthpartnership.net/fileadmin/uploads/ihp/Documents/Country_Pages/Senegal/PNDS2009_2018.pdf

Technical and Financial Partners

Organization	Activity	Geographic Region
Envision ¹¹⁴	<ul style="list-style-type: none"> Starting activities in Senegal USAID's previous NTD program provided limited assistance to Senegal to field test and implement the Funding Gap Analysis Tool (FGAT) 	N/A
HKI ¹¹⁵	<ul style="list-style-type: none"> Supports the integration of de-worming with vitamin A supplementation programs or with Community-based Management of Acute Malnutrition (CMAM) 	Countrywide
Sight Savers ¹¹⁶	<ul style="list-style-type: none"> Distributes antibiotics Conducts cataract operations Conducts trichiasis operations 	Louga
International Trachoma Initiative ¹¹⁷	<ul style="list-style-type: none"> National program has received more than 3.5 million Zithromax@treatments In 2011, targeted almost 900,000 people for treatment 	Diourbel, Kaffrine, Kaolack, Louga
Project Crevette ¹¹⁸	<ul style="list-style-type: none"> Restores the prawn population in the lower Senegal River basin to its original size before the Diama Dam was built. The prawns interrupt the life cycle of the parasite. 	Senegal River Basin
Deworm the World ¹¹⁹	<ul style="list-style-type: none"> Dewormed 579,000 children in 2010 Dewormed over 829,000 children in 2011 	N/A

2009–2011

Rural WASH Landscape

Safe water supply and sanitation infrastructures are identified as priorities in Senegal's Strategic Plans for Poverty Reduction.¹²⁰ The first Global WASH Forum was held in Dakar in 2004 and Senegal established the Ministry of Sanitation and Public Hygiene in 2005 to coordinate WASH activities.¹²¹ The PEPAM

¹¹⁴RTI International. 2012. Neglected Tropical Disease Control Program Final Report. http://www.rti.org/pubs/NTDCP_FINAL_REPORT_lo_res.pdf

¹¹⁵Helen Keller International. 2010. Helen Keller International Position Paper Control of Neglected Tropical Diseases. <http://www.hki.org/research/HKI%20NTD%20External%20Position%20Paper.pdf>

¹¹⁶Sight Savers. Our Work in Senegal. http://www.sightsavers.org/our_work/around_the_world/west_africa/senegal/default.html

¹¹⁷International Trachoma Initiative. Senegal at a Glance. <http://trachoma.org/senegal/>

¹¹⁸Project Crevette. <http://www.projet-crevette.org/index.php?lang=en>

¹¹⁹Deworm the World. Where we work. <http://www.dewormtheworld.org/where-we-work>

¹²⁰WSSCC. 2013. Wash Sector at a Glance: Senegal. <http://www.wsscc.org/countries/africa/senegal/wash-sector-glance>

¹²¹WSSCC. Senegal: WASH Coalition Overview. <http://www.wsscc.org/countries/africa/senegal/wash-coalition-overview>

(Millennium Water and Sanitation Program) Implementation Committee coordinates government and donor WASH stakeholders. The Senegal WASH coalition includes the National Office for Sanitation of Senegal, government departments, civil society, development partners, the private sector, consumer associations, and academia. A donor subsector group meets regularly and has subgroups on urban and rural water and sanitation respectively.¹²²

PEPAM set Senegal's progressive policy and investment program¹²³ and its objectives for rural Senegal are as follows:¹²⁴

- Provide sustainable drinking water for 2.3 million people and ensure access of rural households to potable water from 64 percent in 2004 to 82 percent in 2015.
- Support rural households to install solutions to deal with excreta and domestic wastewater from 17 percent in 2004 to 59 percent in 2015.
- Increase public toilets in major public places (schools, health posts, weekly markets, bus stations, etc.) in rural communities.

Under PEPAM, rural water is managed by¹²⁵

- Directorate of Rural Water Supply responsible for the planning, implementation, and monitoring of new construction of drinking water in rural areas.
- Directorate of Operation and Maintenance responsible for the technical support and advice to users' associations and management committees, the implementation process of transfer to the private sector operational maintenance of rural boreholes and monitoring and control public service of drinking water in rural areas.
- Directorate of the Management and Planning of Water Resources responsible for the inventory of groundwater abstraction, modeling, and quality and quantity of groundwater resources monitoring and implementation of the management plan for the Lake Guiers.

The Ministry of Prevention, Public Hygiene and Sanitation (MPHPA) and its Sanitation Department, defines strategy, sets rates, and implements sanitation programs. In rural areas, sanitation is organized around regional sanitation divisions under the MPHPA. Rural communities and local authorities also play a role, in the form of decentralized cooperation and in collaboration with non-governmental organizations (NGOs). Government and donor funding is required for rural water supply and sanitation (WSS) to scale-up the ASUFOR model.¹²⁶ In 2009, the African Development Bank approved the second phase of PEPAM using the ASUFOR model.

Senegal has received donor support for improving the WSS sector though most improvements have been in urban and peri-urban areas. In rural areas, the World Bank funds the largest water sector projects.

¹²² WSSCC. Senegal: WASH Sector at a Glance. <http://www.wsscc.org/countries/africa/senegal/wash-sector-glance>

¹²³ USAID. 2010. Senegal Water Sanitation Profile. <http://www.washplus.org/sites/default/files/senegal2010.pdf>

¹²⁴ PEPAM. Vue d'ensemble. <http://www.pepam.gouv.sn/ensemble/index.php?rubr=vue>

¹²⁵ PEPAM. Les agences d'exécution. <http://www.pepam.gouv.sn/ensemble/agences.php>

¹²⁶ USAID. 2010. Senegal Water Sanitation Profile. <http://www.washplus.org/sites/default/files/senegal2010.pdf>

USAID and the African Development Bank also work in rural Senegal on PEPAM and rural WSS development and water resources.¹²⁷

Notable Ongoing WASH Initiatives

Senegal has made strides in achieving the MDGs for water and sanitation in the urban areas. Many ongoing initiatives address urban issues and rural access to water and sanitation. These initiatives are often coordinated under PEPAM with loans from the World Bank, European Investment Commission, and the African Development Banks. The chart below describes some WASH activities in rural Senegal.

Organization	Activity	Geographic Region
USAID/Water and Sanitation Program ^{128,129} RTI	<ul style="list-style-type: none"> Rehab and strengthen ASUFORs WASH program in six communities WASH program MDG support Roof and Latrine project 	<p>Ziguinchor</p> <p>Sedhiou</p> <p>Kolda</p> <p>other regions TBD</p>
2009–2014		
Water and Development Alliance (WADA) ¹³⁰	<ul style="list-style-type: none"> Builds capacity for WASH governance Provides small grants for water and sanitation infrastructure 	<p>Phase I: Tambacounda</p> <p>Phase II: Ziguinchor</p> <p>Sédhiou</p>
(2007–2013)		
USAID/PEPAM		Kolda
Development Grants Program ¹³¹ 2009–2011	<ul style="list-style-type: none"> Builds wells in middle schools 	Ziguinchor, Tambacounda, Kedougou, Fatick, Saloum Delta
<ul style="list-style-type: none"> Caritas Senegal Centre Regional pour l’Eau Potable et l’ Assainissement (CREPA) Groupe d’Action pour le Developpement Communautaire Réseau Africain pour le Développement Intégré West African Association for Marine Environment 		

¹²⁷USAID. 2010. Senegal Water Sanitation Profile. <http://www.washplus.org/sites/default/files/senegal2010.pdf>

¹²⁸USAID. 2011. USAID/PEPAM. <http://senegal.usaid.gov/en/node/426>

¹²⁹RTI International. USAID Millennium Water and Sanitation Program(USAID/PEPAM). http://www.rti.org/brochures/senegal_water_eng.pdf

¹³⁰USAID/Senegal. 2012. USAID Teams with Coca-Cola to Help Improve Village Water and Sanitation. <http://senegal.usaid.gov/en/node/661>

¹³¹USAID/Senegal. 2009. USAID/Senegal Development Grants Program Recipients. <http://senegal.usaid.gov/en/node/148>

Agriculture and Natural Resource Management Program (Wula Nafaa) ^{132,133}	<ul style="list-style-type: none"> • Supports hygiene promotion activities in health facilities • Conducts CLTS 	Tambacounda, Kédougou, Kolda and Ziguinchor, Casamance (coastal) Sine-Saloum (coastal)
International Resources Group 2009–2014		
USAID/GOS – Ministry of Education ¹³⁴	<ul style="list-style-type: none"> • Builds wells in middle schools 	N/A
UNICEF Program ^{135,136}	<ul style="list-style-type: none"> • Supports hygiene promotion activities in health facilities • Conducts CLTS 	Matam, Diourbel, Louga, St. Louis, areas most affected by nutritional crisis

Integrated WASH-NTD Initiatives

The review found a few programs that have both WASH and NTD components.

Organization	Activity	Geographic Region
International Coalition for Trachoma Control ¹³⁷	<ul style="list-style-type: none"> • Implements environmental and facial cleanliness activities • Builds latrines, installs water sources, creates radio and school programming 	Kaolack Kaffine Fatick Louga Sedhiou Ziguinchor
Water Resources Integrated Management Program ¹³⁸	<ul style="list-style-type: none"> • Program to reduce mortality and morbidity related to malaria, STH • Distributed insecticide-treated bed nets, de-worming medicines and 	Matam, Saint Louis and Louga

¹³²USAID/Senegal. Fact Sheet: USAID/Senegal’s Water and Sanitation Portfolio.

http://senegal.usaid.gov/sites/default/files/USAID%20Senegal%20wat%20san_%20English.pdf

¹³³USAID/Senegal. Agriculture and Natural Resources Management: USAID/Wula Nafaa.

<http://senegal.usaid.gov/en/node/137>

¹³⁴USAID/Senegal. Fact Sheet: USAID/Senegal’s Water and Sanitation Portfolio.

http://senegal.usaid.gov/sites/default/files/USAID%20Senegal%20wat%20san_%20English.pdf

¹³⁵UNICEF. 2013. Monthly Humanitarian Situation Report SENEGAL

Date: March 2013. http://www.unicef.org/appeals/files/UNICEF_Senegal_SitRep_Mar2013.pdf

¹³⁶UNICEF. 2012. Humanitarian Situation Report Senegal

2012 Overview. http://www.unicef.org/appeals/files/UNICEF_Senegal_SitRep_2012_Overview-EXTERNAL_.pdf

¹³⁷ International Coalition for Trachoma Control. Senegal.

<http://www.trachomacoalition.org/maps/search/all?country=175>

¹³⁸ Counterpart International. Water Resources Integrated Management Program. <http://www.counterpart.org/our-work/projects/water-resources-integrated-management-program-in-senegal>

Counterpart International

- flatworm treatment.
- Finalized disease prevention training curriculum for community health workers

While not the primary focus of this review, it is noteworthy that in 2004 WHO certified Senegal as guinea worm free citing the government's multi-sectorial eradication activities as contributing to the overall success.¹³⁹ Along with pharmacological treatment, the eradication effort focused on WASH activities such as increasing access to safe water supply, health education, distributing nylon water filters. Inter-ministerial coordination and political leadership are integral factors that led to the eradication of guinea worm.

Discussion and Opportunities

The government of Senegal has demonstrated a serious commitment to meeting the MDGs in WASH. The government's success in eradicating guinea worm is a clear indication that the government can be motivated to develop an intense and robust program that addresses disease control and eradication. However, our desk review was unable to identify robust NTD structures, coordination mechanisms, and programs currently in place though they are purported to exist.

The one known NTD program is focused on implementing the Surgery, Antibiotics, Face Washing, and Environmental Sanitation (SAFE) strategy for eliminating trachoma. This program is already implementing some components of WASH in line with the F and E components of SAFE.

Senegal's commitment to WASH infrastructure is a plus in its favor. However, the Taskforce for Global Health and partners are not interested in Senegal. Our limited knowledge of Senegal's NTD structures and commitment makes it difficult to make an informed decision. However, in our meeting with USAID, the NTD team further cautioned WASHplus about engaging in Senegal at this time since the development community climate is rather complex and not transparent. For these reasons we would not propose Senegal as a Phase 2 assessment country.

¹³⁹ Carter Center. Fighting Disease: Senegal. Eradicating Guinea Worm Disease. <http://www.cartercenter.org/countries/senegal-health.html>

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<http://www.counterpart.org/our-work/projects/water-resources-integrated-management-program-in-senegal>

Deworm the World. n.d. **Where we work.** <http://www.dewormtheworld.org/where-we-work>

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<http://www.hki.org/research/HKI%20NTD%20External%20Position%20Paper.pdf>

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Annexes

Annex 1: Disease Status by Country

(Countries with USAID NTD programs are asterisked.)

Disease	Have Reported Achieving Ultimate Intervention Goals (UIGs) for Trachoma; “Successful Control” for Schisto, STH			High-burden Countries			Other Countries		
	Trachoma	Schisto	STH	Trachoma	Schisto	STH	Trachoma	Schisto	STH
Countries	ALL of AFRICA	ALL of AFRICA		Burkina Faso*	Ghana	Afghanistan	Afghanistan		
				Ethiopia	Madagascar	Bangladesh*	Australia		
	EXCEPT:	EXCEPT:		Guinea*	Mozambique	Burma	Benin*		
	Algeria	Algeria		Kenya	Sierra Leone	India	Botswana	Burundi	
	Botswana	Egypt		Mozambique*	Tanzania	Indonesia*	Cambodia		
	Egypt	Ghana		Niger*		Laos	Cameroon*		
	Libya	Libya		Nigeria		Philippines*	CAR		
	Morocco	Mauritania		Pakistan		Thailand	Chad		
	Namibia	Morocco		Senegal*			Cote d’Ivoire		
	Tunisia	South Africa		Sudan		ALL of	Djibouti		
		Tunisia		South Sudan		Sub-Saharan Africa	Egypt		
				Tanzania*			Eritrea		
				Uganda*			Fiji		
				Zambia		EXCEPT:	Guatemala		
						Botswana	Guinea Bissau		
						South Africa	Iraq		
						Zimbabwe	Kiribati		
							Laos		
							Mali		
							Malawi		
							Mauritania		

Myanmar
 Namibia Nauru
 Nepal*
 Papua NG
 S. Islands
 Somalia
 Togo*
 Vanuatu
 Yemen
 Zimbabwe

# of countries	9	6 (?)	0	14	77	33	52		
% of endemic population	0%			83%		17%			
% of Trichiasis burden	6%	NA	NA	71%	NA	NA	23%	NA	NA

Ghana and Vietnam have only reported reaching Ultimate Intervention Goals (UIGs) for active trachoma, not yet for surgery; The Gambia is awaiting final results from surveys; however, preliminary data show that UIG have been reached. USAID-supported country Haiti does not appear in in any of the disease profiles above; 75% of schisto and STH programs target school children through school-based programs.

Annex 2: Focus NTDs at a Glance

Trachoma

Symptoms/disability caused	Mode trans-mission and environmen-tal risk factors	WASH link with NTD	Number of people at-risk globally	Global DALY burden	Current method treatment and prevention	Target for control/ elimination and target year	Percent of at-risk population receiving treatment
Leading cause of preventable blindness. Caused by the obligate intracellular bacterium <i>C. trachomatis</i> . Recurrent episodes of conjunctival infection and associated chronic inflammation initiates a scarring process that ultimately leads to irreversible blindness ¹⁴⁰ through inward turning of lashes rubbing against cornea (trichiasis).	Spread through contact with eye discharge from infected person (towels, bedding, hair, fingers) and through eye-seeking flies (musca sorbens). ¹⁴¹ Family principle unit of transmission. Environmental risk factors are water shortage, flies, poor hygiene conditions, inadequate disposal of human and animal waste ¹⁴²	Sanitation (latrine construction and borehole drilling) (Reference #1), hygiene (face washing), water (provision and access). ¹⁴³ Improving WASH can reduce trachoma by 27% and improved sanitation could reduce schisto by as much as 77%. ¹⁴⁴	320 million people living at risk worldwide - 110 million live in areas of confirmed endemicity - 210 million live in areas where suspected but inadequate data Endemic in 56 countries, with 80% of burden of active trachoma concentrated in 14 countries. ¹⁴⁵ Countries with highest prevalence in sub-Saharan Africa, particularly Sahel belt and East Africa (also Middle East, Indian sub-	1.334 million Disability Adjusted Life Years ¹⁴⁶	WHO recommended SAFE strategy (Surgery to eyelids, antibiotics to treat community pool of infection, facial cleanliness to reduce transmission, and environmental improvements) to reduce number of flies. WHO recommends two antibiotics for control: oral azithromycin and tetracycline ointment. F activities: promotional campaigns using local radio; work with MOEs to get face and hand-washing on school curricula. Approaches are used and tested but not well – coordinated. E activities: access to clean water prerequisite to successfully promote other elements of SAFE strategy; organizations like WaterAid have dedicated water	WHO Roadmap for implementation sets a target of elimination of trachoma as public health problem by 2020. The GET2020 Alliance defines its goal of elimination using the following WHO criteria: - reduction of prevalence to < 5% in children aged 1–9 years - maximum trichiasis burden of 1/1000 in the total population - significant activities to address F and E	13.1% of people at risk currently receive treatment (Reference #6).

¹⁴⁰ Burton, Matthew J., Mabey, David C.W., The Global Burden of Trachoma: A Review, October 27, 2009. PLOS Neglected Tropical Diseases. www.plosntds.org/article/info%3Adoi%2F10.1371%2Fjournal.pntd.0000460

¹⁴¹ World Health Organization. Prevention of blindness and visual impairment: priority eye diseases: Trachoma. <http://www.who.int/blindness/causes/priority/en/index2.html>

¹⁴² World Health Organization. Water-related Diseases: Trachoma. Available at: http://www.who.int-water_sanitation_health/diseases/trachoma/en/

¹⁴³ WASH: The silent weapon against NTDs: Working together to achieve prevention, control and elimination.

¹⁴⁴ Esry SA, et al. 1991. Effects of Improved Water Supply and Sanitation on Ascaris, Diarrhea, Dracunculiasis, Hookworm Infection, Schistosomiasis, and Trachoma. Bulletin of the World Health Organization 69 (5):609-21.

¹⁴⁵ The end in sight. 2020 INSight, July 2011, International Coalition for Trachoma Control. ISBN: 978-0-615-50582-4

¹⁴⁶ UK Coalition against NTDs: Annual report 2012. Report for the All-Party Parliamentary Group on Malaria and Neglected Tropical Diseases (APPMG), House of Commons.

and crowded households.

Continent and SE Asia)

63% of all people living in suspected or confirmed endemic areas live in five countries: Ethiopia, Nigeria, Pakistan, Egypt, Mozambique.

- 21.4 million affected
- 2.2 million visually impaired
- 1.2 million blind (reference #2)

programs, but not well-aligned with trachoma or broader plans to address other NTDs.¹⁴⁷

components

All of the above need to apply in every endemic district. (Reference #6)

¹⁴⁷ Ibid.

Schistosomiasis

Symptoms/disability caused	Mode transmission and environmental risk factors	WASH link with NTD	Number of people at-risk globally	Global DALY burden	Current method treatment and prevention	Target for control/ elimination and target year	Percent of at-risk population receiving treatment
<p>Caused by parasitic worms and is prevalent in tropical and sub-tropical regions. Chronic infection can lead to anemia and malnutrition.</p> <p>Adult worms can remain in the body and cause damage to organs.¹⁴⁸</p>	<p>Infection occurs when freshwater snails release the larvae of the parasite. The larvae enter through the skin when it comes into contact with infested water. The larvae mature in people's blood vessels and some exit the body through urine and feces.</p>	<p>Caused by lack of hygiene. Clean drinking water, adequate sanitation can reduce contact with infected water.¹⁴⁹</p>	236 million ¹⁵⁰	<p>1,707,000 Disability Adjusted Life Years¹⁵¹</p>	<p>WHO recommends preventative chemotherapy with praziquantel (.07 cents per tablet) and efforts to improve water sanitation and hygiene.</p> <p>Mass drug administration (MDA) is distributed at the community level and through school-based programs and has been successful in controlling schistosomiasis.</p> <p>Through MDA has been effective in controlling schistosomiasis, praziquantel does not prevent reinfection.¹⁵² Furthermore, when MDA is not conducted consistently in high transmission areas, the preventative chemotherapy may increase morbidity in children.¹⁵³</p>	<p>WHO recommendation is to control schisto by 2020.</p> <p>To eliminate schisto as a public health problem by 2025.</p> <p>To interrupt transmission in selected regions by 2025.</p>	<p>13.1 % of people at risk currently receive treatment.¹⁵⁴</p> <p>77 countries are endemic.</p> <p>51 countries require preventative chemotherapy.</p>

¹⁴⁸ WHO Fact Sheet 115. Schistosomiasis. March 2013.

¹⁴⁹ Ibid.

¹⁵⁰ UK Coalition against NTDs: Annual report 2012. Report for the All-Party Parliamentary Group on Malaria and Neglected Tropical Diseases (APPMG), House of Commons.

¹⁵¹ Ibid

¹⁵² Gray, D; et al. *Schistosomiasis elimination: lessons from the past guide the future*. The Lancet. Vol 10. October 2010.

¹⁵³ Mara, et al. *Sanitation and Health*. PLoS Medicine. Vol 11. November 2010.

¹⁵⁴ UK Coalition against NTDs: Annual report 2012. Report for the All-Party Parliamentary Group on Malaria and Neglected Tropical Diseases (APPMG), House of Commons.

Soil-transmitted Helminth Infections

Symptoms/disability caused	Mode transmission and environmental risk factors	WASH link with NTD	Number of people at-risk globally	Global DALY burden	Current method treatment and prevention	Target for control/ elimination and target year	Percent of at-risk population receiving treatment
<p>Infestations with four species of nematodes (mainly hookworm, roundworm, whipworm).</p> <p>Symptoms related to the number of worms harbored.</p> <p>Symptoms include: anemia, intestinal manifestations(diarrhea, abdominal pain), weakness, and decreased mental and physical development.¹⁵⁵</p>	<p>Caused by parasitic worms. Transmitted by eggs in human feces, which infect soil in areas with poor sanitation.</p> <p>Adult worms live in the intestine and reproduce rapidly.</p> <p>Eggs ingested through unwashed vegetables, contaminated water sources, eating without hand washing.</p>	Improved sanitation can decrease soil contamination ¹⁵⁶	890 million people living at risk worldwide. ¹⁵⁷	4,013,000 Disability Adjusted Life Years. ¹⁵⁸	Preventative chemotherapy with albendazole or mebendazole and efforts to improve water, sanitation and hygiene.	<p>WHO recommendation is to control STH by 2020: Control morbidity through MDAs.</p> <p>Global target: least 75% of all at-risk school-age children by 2020.¹⁵⁹</p>	31.1% of people at risk currently receive treatment. ¹⁶⁰

¹⁵⁵ WHO Fact Sheet 366. Soil transmitted Helminth Infections. March 2013.

¹⁵⁶ Ibid.

¹⁵⁷ UK Coalition against NTDs: Annual report 2012. Report for the All-Party Parliamentary Group on Malaria and Neglected Tropical Diseases (APPMG), House of Commons.

¹⁵⁸ Ibid.

¹⁵⁹ Jia, TW; et al. *Soil-Transmitted Helminth Reinfection after Drug Treatment: A Systematic Review and Meta-Analysis* .PLoS Medicine. Vol 10. May 2012.

¹⁶⁰ UK Coalition against NTDs: Annual report 2012. Report for the All-Party Parliamentary Group on Malaria and Neglected Tropical Diseases (APPMG), House of Commons.

Annex 3: Annotated Bibliography of Some Resources

Several comprehensive reviews were identified in writing this paper, some of which are currently ongoing and results not yet available. The following is an annotated list, providing some detail on depth and breadth of review where available and on main findings and recommendations. Some individual studies are also highlighted. In general, WASH interventions added to mass drug administration (MDA) are recommended. However, the jury is out on which intervention or package of interventions adds the greatest value in terms of impact on reinfection rates.

NTDs General

- ***Social and Economic Impact Review on NTDs.***

Economic Policy/Briefing Paper by Hudson Institute in conjunction with the Global Network of NTDs, November 2012. Bibliography of 222 articles on seven NTDs (lymphatic filariasis, onchocerciasis, schistosomiasis, three soil-transmitted helminthes and trachoma), in addition to policy analysis through interviews of 28 people active in NTD control.

Conclusions and Recommendations: NTD programs require sustained effort over a long period of time to be effective, as well as improvements in water and sanitation infrastructure and/or vector control. The case of elimination of trachoma in Morocco was cited as an example of a program that used a multi-pronged approach, combining azithromycin with the F and E of the SAFE strategy, and collaboration among different ministries (including political will).

- ***Integrating WASH Across Development Sectors: Chapter V: NTDs and WASH.***

Work in progress by WASH Advocates.

- ***Health Benefits from Improvements in Water Supply and Sanitation: Survey and Analysis of the Literature on Selected Diseases.***

Technical Report No. 66, July 1990, USAID-funded WASH project. One hundred forty-four studies were reviewed.

Conclusions and Recommendations: Impact of water supply and sanitation is significant for reductions in diarrheal diseases, ascariasis, guinea worm, hookworm, schistosomiasis, and trachoma. Water supply should be as close to the home as possible and WASH programs should emphasize hygiene education to encourage people to use more water for personal and domestic purposes.

Soil-Transmitted Helminthes Studies

- ***Effect of Sanitation on Soil-Transmitted Helminth Infections: Systematic Review and Meta-Analysis.***

PLoS Medicine, 2012. Thirty-six publications, consisting of 39 datasets, met inclusion criteria.

Conclusions and Recommendations: Despite study limitations (most were cross-sectional designs of low quality with potential biases and considerable heterogeneity), results revealed that sanitation is associated with reduced risk of transmission of helminthiasis to humans. Access to improved sanitation should be prioritized with continued preventive chemotherapy.

- ***Effect of water, sanitation and hygiene on soil-transmitted helminth infection: a systematic review and meta-analysis*** (55 publications available for analysis)

Contributors: E Struntz, M Freeman, M Stocks, S Ogden and D Adiss

Not yet published (for internal use only)

Conclusion and Recommendation: WASH exposures are generally associated with reduced risk of helminthiasis. Further research is warranted with stronger methodological design to better assess causal links.

- ***Impact of WASH on STHs, Timor Leste.***

Randomized control trial (RCT) to determine if the reinfection of STHs is significantly reduced following a community-led total sanitation (CLTS) intervention. Study is currently ongoing by the University of Queensland in partnership with Nossal Institute for Global Health, Menzies School of Health Research and WaterAid Australia.

- ***WASH Benefits Study, Bangladesh and Kenya***

The goal of the WASH Benefits Study is to generate rigorous evidence about the impacts of sanitation, water quality, hand washing, and nutrition interventions on child health and development in the first years of life. The study is designed as two, highly comparable cluster randomized trials in rural Bangladesh and Kenya. In each country, the study has seven arms (six treatment arms and a control arm). Among many primary and secondary study objectives, two secondary objectives will look at: measuring the impact of sanitation, water quality, hand washing, and nutritional interventions on intestinal parasitic infection prevalence and intensity; measuring the

association between parasitic infection and other measures of enteric health, including acute diarrhea and environmental enteropathy. Funded by BMGF. Jack Colford and Stephen Luby, investigators for Bangladesh. Michael Kremer and Clair Null, investigators for Kenya.

- ***Health-Education Package to Prevent Worm Infections in Chinese Schoolchildren***
Beiri, F, D Gray, G Williams, G Raso, Y Li, L Yuan, Y He, R Li, B Tech, F Guo, S. Li, D McManus, N Engl J Med 2013; 368:1603-1612/April 25, 2013.
Determined effect of educational package on 38 rural schools in Linxiang City District, Hunan Province over 1 year (single-blind, unmatched, cluster-randomized intervention trial involving 1718 children, 9 to 10 years of age). Educational package included a 12-minute cartoon video promoting STH knowledge and awareness prevention, including hygiene and sanitation, coupled with administration of albendazole treatment at baseline. Cartoon was complemented by classroom discussions, display of a poster, dissemination of a pamphlet emphasizing the key messages delivered in the cartoon and drawing and essay-writing competitions to enforce the messages.

Conclusion and Recommendation: Increased students' knowledge about STH and led to a change in behavior and reduced incidence of infection with STH 50 percent lower in the intervention group than in the control. In 10 control and 10 intervention schools where researchers covertly observed hand washing behavior 98.9 percent of students in the intervention schools washed their hands after using the toilet while rates of hand washing showed no change in the control group. Future programs should involve the integration of chemotherapy and health education in combination with efforts to ensure clean water, good sanitation, and improved personal hygiene.

High latrine coverage is not reducing the prevalence of soil-transmitted helminthiasis in Hoa Binh province, Vietnam

Yajima A, P Jouquet, D Trung, T Dan Thi Cam, D Tran Cong, D Orane, A Montresor
Trans R Soc Trop Med Hyg. 2009 103, 237-241

Baseline epidemiological survey for parasite infections was conducted in December 2007 and January 2008; stool samples were collected from 155 residents, 152 of whom had latrines at home (98.1 percent). Incidentally more than half of participants used animal manure in agriculture. Over 70 percent of the individuals tested positive for at least one STH.

Conclusion and Recommendation: Results indicated that villagers were infected with parasites through consumption of locally produced vegetables rather than directly ingesting soil, suggesting that it is not the manipulation of human feces that

promotes infection but the consumption of vegetables fertilized with feces or wastewater contaminated with agricultural effluent. An important implication of the study's findings is that improvement of latrine coverage alone cannot control infection in areas where human feces are widely used in agriculture. Composting the feces in pits can significantly reduce the capacity of helminth eggs to transmit infection.

- ***The role of health education and sanitation in the control of helminth infections***
Asaolu S and IE Ofoezie. Acta Tropica 86 (2006) 283-294.

These authors reviewed various health education and sanitation interventions from around the world to determine what roles they have played in the past relative to other intervention strategies and the role they have to play in future control efforts. A comprehensive computer search of titles related to the influence of water supply, sanitation and health education on ascariasis, trichuriasis, hookworm, and schistosomiasis infections were undertaken using MEDLINE for 1976–2000.

Conclusion and Recommendation: Though chemotherapy has been and will remain the best option for morbidity control, sanitation has an important role to play not only to sustain the benefits of chemotherapy but also to protect the uninfected. Health education that is effective, simple, and low-cost remains the only tool for creating the enabling environment for both chemotherapy and sanitation to thrive.

Schistosomiasis Studies

- ***Systematic Review and Meta Analysis for Schistosomiasis.***
Currently ongoing by the Imperial College in London.
- ***Cost-effectiveness of a community-based intervention for reducing the transmission of Schistosoma haematobium and HIV in Africa***
Mbah, M, E Kjetland, K Atkins, E Poolman, E Orenstein, L Meyers, J Townsend, A Galvani, March 12, 2013. Published in the National Academy of Sciences, Early Edition.
Developed transmission model of female genital schistosomiasis prevalence and coinfection in rural Zimbabwe and used model to evaluate cost-effectiveness of a multifaceted community-based intervention for preventing schistosomiasis, and consequently HIV infections. Intervention combined provision of clean water, sanitation, and health education with administration of praziquantel to school-aged children.

Conclusion and Recommendation: Model predicted that community-based intervention is cost-effective and an attractive strategy for reducing schistosomiasis and HIV transmission that would have an enormous impact on averting infections and saving lives.

Trachoma Studies

- ***Environmental sanitary interventions for preventing active trachoma (Review), The*** Rabiou, M, Alhassan M, Ejere H, Evans J, Cochrane Collaboration, 2012, Issue 2. Five hundred sixty-three citations, abstracts, reports were reviewed at three separate points in time with six meeting inclusion criteria, i.e., randomized and quasi-randomized controlled trials comparing any form of environmental hygiene measures (fly control, provision of water and health education) with no measure. Participants in the trials were people normally resident in the trachoma endemic areas.

Conclusions and Recommendations: There is some evidence from two trials that insecticides are effective in reducing trachoma; however this effect was not demonstrated in another trial that used insecticides. Two trials on latrine provision as a fly control measure did not demonstrate significant trachoma reduction. Health education showed significant reduction in one study but not in another. Generally there is a dearth of data to determine effectiveness of all aspects of environmental sanitation in control of trachoma.

- ***The Cochrane Library and trachoma: an overview of reviews*** Sumamo, E, P Emerson, K Harvey and M Burton. Evidence-based Child Health 2: 943-964 (2007). Summarized Cochrane reviews that assessed the effect of SAFE strategy for trachoma. The Cochrane Database of Systematic Reviews was searched for any intervention to prevent or treat trachoma. Data were extracted in duplicate and analyzed. There were four systematic reviews all of which met inclusion criteria.

Conclusions and Recommendations: Among other findings, there was some evidence that face washing in combination with topical tetracycline antibiotics can reduce the prevalence of severe trachoma compared to face washing alone. Insecticide spray as a fly control measure significantly reduced trachoma and health education may be effective in reducing active trachoma. There were no clinical trials of implementation of the full Surgery, Antibiotics, Face Washing, and Environmental Sanitation (SAFE) strategy. However, there was some evidence that separately supports each of the SAFE components. It was recommended that delivery of the full SAFE strategy is warranted programmatically and that its delivery should have a positive impact on control of trachoma.

- ***Systematic Review and Meta Analysis for Trachoma and STH, 2013.***
Currently ongoing by the Task Force for Global Health, International Trachoma Initiative (ITI), Children Without Worms (CWW), and the Emory Center for Global Safe Water (CGSW). Trachoma review complete and findings to be published soon. Of 82 studies only 8 were intervention studies with the remainder, observational studies. STH review will be complete by May 2013.

Preliminary Findings: (of trachoma review). Household latrine use decreases by half risk of trachoma. Face washing alone has similar impact. Face washing more than once per day has greater impact and use of soap has additional impact. There was no association found with water interventions. Could not compare use of face washing and latrine use in combination so cannot say whether use of both together has an added impact. One caveat was that the results were much more streamlined for sanitation than for hygiene.

Recommendation: Intervention study with MDA and other WASH interventions is needed.

- ***Review of trachoma programs*** (viewing integration of WASH and trachoma from a policy perspective).
Currently ongoing by Nancy Allen for Hilton Foundation.
- ***Will the SAFE Strategy be Sufficient to Eliminate Trachoma by 2020? Puzzlements and Possible Solutions.***
PAHO, Hamilton Eye Institute, IAPB Latin America and Strategic Solutions, Inc. January 2013. One hundred and twenty-five citations (literature from 1998 through January 2013 in PubMed).

Conclusions and Recommendations: Although results are inconclusive on the benefits of the F and E components of the SAFE strategy in reducing active trachoma, it is concluded that environmental interventions are crucial to overall health and hygiene of the community. Scale-up is needed for all SAFE components but more evidence is needed to understand effect and impact of environmental improvements on prevention; in addition more research is needed from communities outside of Africa and Asia.

- ***Review of the evidence base for the “F” and “E” components of the SAFE strategy for trachoma control***

Emerson P, S Cairncross, R Bailey and D Mabey. Tropical Medicine and International Health, Volume 5, No 8 pp 515-527. August 2000.
Observational and intervention studies were reviewed.

Conclusion and Recommendation: Evidence from intervention studies showed that the promotion of face-washing gave modest gains for intense effort and a pilot study showed that trachoma transmission was reduced in the absence of eye-seeking flies. Other studies have shown that latrines and improved access to water are associated with lower prevalence of active trachoma. There is likely to be a long-term beneficial effect of a combination of improved water supplies, provision of latrines, facial hygiene promotion through established infrastructure and control of eye-seeking flies. Each of these interventions offers additional public health and other benefits in its own right. Further research on the routes of transmission, the role of hygiene, and means of sustainable fly control should be a priority.

- ***A cross-sectional survey of water and clean faces in trachoma endemic communities in Tanzania.***

Rog M, B. Swenor, L Cajas-Monson, W Mchiwe, S Kiboko, H Mkocha, and S West. BMC Public Health, 2011, June 24; 11:495.

Household water use survey in 173 households (329 children); self-reported data on water use practices, observed water in household, and observed clean faces in children.

Conclusion and Recommendation: Women are primary decision makers on water use in household and respondents who reported laziness as a reason that others do not wash children's faces were significantly more likely to have children with clean faces. Attitudes toward face washing and household use have changed from 20 years ago when clean faces were rare and men made decisions about household water use. These positive changes will assist trachoma control programs in strengthening its hygiene efforts.

- ***Comparing the effectiveness of shared versus private latrines in preventing trachoma in rural Tanzania***

Montgomery, M, M Desai and M Elimelech. Am J Trop Med Hyg. 2010 Apr;82(4):693-05.

This study examined link between disease and poorly maintained communal latrines (latrine use in 594 households in seven rural Tanzanian communities). Case households were defined by having a child with clinical signs of trachoma.

Conclusion and Recommendation: Latrine use was associated with a decreased risk of trachoma and there was no difference in risk between households who shared latrines compared with private latrines. The study emphasized the need to promote latrine use, which can be facilitated through latrine sharing in resource scarce areas, for prevention of trachoma.

- ***Assessment of latrine use and quality and association with risk of trachoma in rural Tanzania***

Montgomery M, M Desai and M Elimelech. *Trans R Soc Trop Med Hyg.* 2010 Apr; 104(4):283-9.

Examined association between use and quality of latrines and risk of trachoma (case control study of 678 households in eight villages in Kongwa District). Case households were defined as having a sentinel child with clinical signs of trachoma.

Conclusion and Recommendation: Latrines regardless of quality were significantly associated with decreased risk of trachoma. These findings underscore importance of achieving 100 percent latrine use in communities.

- ***Evaluating a school-based trachoma curriculum in Tanzania***

Lewallen S, P Massae, M Tharaney, M Somba, R Geneau, C Macarthur, P Courtright. *Health Educ Res.* 2008 Dec;23(6):1068-73.

Evaluated changes from 2004–2005 in knowledge and reported behavior change as well as nasal and ocular discharge and clean faces in selected schools in central Tanzania (mixed-methods study involving schoolchildren and teachers).

Conclusion: Significant reduction in nasal discharge and dirty faces and improvements in knowledge and behavior-related indices by primary school children in intervention villages. Teachers viewed curriculum positively but reported that lack of water at schools limited application of health education messages (no wells at schools and minimal latrine facilities) and therefore usefulness of trachoma curriculum.

- ***Intensive insecticide spraying for fly control after mass antibiotic treatment for trachoma in a hyperendemic setting: a randomized trial***

West S, PM Emerson, H Mkocho, W McHiwa, B Munoz, R Bailey, D Mabey. *Lancet.* 2006 Aug 12;368(9535):596-600.

Study to determine whether insecticide spray intervention after MDA could reduce trachoma in hyper-endemic neighborhoods in Tanzania (single-blind, randomized clinical trial in 16 neighborhoods, children aged 1–7 years). One dose of azithromycin

was offered and households and surrounding areas were sprayed throughout the ensuing year and monitored for reductions in fly counts.

Conclusion: Intensive spraying reduced flies in the environment but results suggest that fly reduction after MDA has no added benefit on trachoma reduction.

- ***Impact of face-washing on trachoma in Kongwa, Tanzania***

West S, B Munoz, M Lynch, A Kayongoya, Z Chilangwa, B Mmbaga, H Taylor. Lancet. 1995 Jan 21;345(8943):155-8.

Community-based randomized trial in three pairs of villages to assess impact on trachoma of a face-washing intervention program following antibiotic administration (1417 children aged 1–7 years).

Conclusion and Recommendation: Community-based participatory approach to face-washing intervention had variable prevention rates in the villages and was labor intensive. Combined with topical treatment, community-based strategies for improving hygiene in children in trachoma-endemic villages, can reduce the prevalence of trachoma.

- ***Testing a participatory strategy to change hygiene behavior: face washing in central Tanzania***

Lynch M, S West, B Munoz, A Kayongoya, H Taylor, B Mmbaga. Trans R Soc Trop Med Hyg. 1994 Sep-Oct;(88(5):513-7.

Strategy used non-formal adult education techniques at neighborhood-level meetings to build community consensus to keep children's faces clean for prevention of eye disease. Participants included men, women, schoolchildren, traditional healers, and village social groups.

Conclusion: Clean faces increased from 9 to 33 percent in one year. Factors related to sustained change in children's clean faces included distance to water, age of the child and presence of a corrugated metal roof. Owning cattle was associated with a lack of sustainable change in this population.

Annex 4: Networks and Partnerships

Organization	Partners
<i>Global Network for Neglected Tropical Diseases</i>	<ul style="list-style-type: none"> • Liverpool School of Tropical Medicine (LSTM) • Columbia University/Earth Institute • Helen Keller International • International Trachoma Initiative • Schistosomiasis Control Initiative • The Task Force for Global Health
<i>Neglecting Tropical Disease NGDO Network</i>	<ul style="list-style-type: none"> • WaterAid • The Fred Hollows Foundation • Sightsavers • University of Queensland, Australia • Emory University/Center for Global Safe Water • Children Without Worms • Save the Children • International Trachoma Initiative
<i>Uniting to Combat NTDs: Ending the Neglect and Reaching 2020 Goals</i>	<ul style="list-style-type: none"> • USAID • DFID • WHO • World Bank • Bill and Melinda Gates Foundation • Pharmaceutical industry • Lions Club International Foundation • National governments
<i>The Alliance for the Global Elimination of Blinding Trachoma by the Year 2020 (GET2020)</i>	<ul style="list-style-type: none"> • WHO • National governments • NGOs • Research institutions • Foundations • Pharmaceutical industry
<i>International Trachoma Initiative</i>	<ul style="list-style-type: none"> • Pfizer • Edna McConnell Clark Foundation, • Task Force for Global Health
<i>International Coalition for Trachoma Control (ICTC)</i>	<ul style="list-style-type: none"> • CBM • Eyes of the World • The Fred Hollows Foundation • Helen Keller International • IAPB • IMA World Health

- ITI
- KCCO
- Light for the World
- Lions Clubs International Foundation
- London School of Hygiene and Tropical Medicine
- OPC
- ORBIS International
- Operation Eyesight Universal
- Pfizer
- RTI ENVISION
- Sightsavers
- The Carter Center
- The University of Melbourne
- Wilmer Eye Institute at Johns Hopkins
- World Vision International

Children Without Worms

- Johnson & Johnson
- GlaxoSmithKline
- Task Force for Global Health

Schistosomiasis Control Initiative

- Imperial College, London
- Bill and Melinda Gates Foundation
- USAID

Annex 5: Main NTD Bibliography

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