PRELIMINARY FINDINGS FROM A LANDSCAPE ANALYSIS

What do we know about Nutrition and WASH among the poorest children in urban East Africa?

Background Document for the Consultation
Reaching the poorest children with nutrition and WASH in urban settings: Implementation Science Priorities in East Africa

June 15-16, 2017
Dar es Salaam, Tanzania
Cover photo: A boy watches over water jerry cans at Korogocho, one of the largest slum neighborhoods of Nairobi, Kenya, which is located next to the city’s principal dumping site. There’s no running water and no sewage system in Korogocho, and many inhabitants make money by sifting through the dump for items such as that they can sell, such as old shoes. © 2009 Toni Siboni, Courtesy of Photoshare Photo ID: 2009-106

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Overview of Urban Health

In theory, cities offer an “urban advantage” providing citizens the promise of a higher quality of life through greater resources, economic progress, service access, and infrastructure. They have the potential to be incubators of innovation and change, yet rapid migration and absolute population growth in the 21st century have led to a confluence of urban challenges. Resource distribution and planning for public services, infrastructure, and housing in the face of swiftly changing population concentration and distribution are urgent priorities given one billion people currently live in slums or informal settlements, and 60% of the world’s population will reside in cities by 2030. Urban prosperity often masks stark disparities and inequities between the urban wealthy and poor, with the poor frequently lagging behind rural populations in terms of health outcomes (WHO-UN Habitat, 2016). Global calls for safe, equitable, socially inclusive, and resilient cities are bringing attention to long-standing public health and urban planning challenges. Further, attaining the Sustainable Development Goals (SDGs) and Universal Health Coverage (UHC) requires countries to both identify new solutions and improve delivery of existing ones for challenges including health inequities, vital statistics and reporting, the varied health-related challenges driven by population density, and health financing.

Sub-Saharan Africa faces a substantial burden in that more than half (56%) of the urban population lives in slums, compared to an average of 29% across all developing regions (UN Habitat, 2016). While many countries in the region have closed the rural-urban gap, nearly all continue to experience rapid urbanization and a rise in urban poverty. As countries scale up efforts to meet the SDGs and attain UHC, an opportunity to plan and directly address health inequities is necessary. Social, economic, public health, and health system challenges all require attention, particularly the double burden of malnutrition (both over- and undernutrition), the triple threat of communicable and non-communicable diseases and violence and injuries, and water and sanitation system safety (WHO-UN Habitat, 2016 & WHO-UN Habitat, 2010). Compared to cities in other low and middle income countries (LMICs) using the Urban Health Index, urban health conditions in Sub-Saharan African cities tend to be far poorer overall, but also vary substantially within the region (WHO-UN Habitat, 2016) – suggesting there is no ‘one size fits all’ solution.

Framing the Nutrition and WASH Challenges among the Poorest Children in Urban Sub-Saharan Africa

Children of the urban poor are among the most vulnerable to urban health inequities. Approximately 200 million children live in urban Africa and are vulnerable to the consequences of extreme poverty (Save the Children, 2012). For example, an estimated 29% of deaths in children under-five occur annually due to problems of sanitation, hygiene, and nutrition (Institute for Health Metrics and Evaluation, 2016). In Sub-Saharan Africa, 61% of diarrhea deaths are attributable to inadequate water,
sanitation and poor hand hygiene (Prüss-Ustün et al, 2014). Additionally, the vulnerability of urban poor children in conflict or emergency settings may be exacerbated, for example, during famine or disease outbreaks. Reducing food insecurity and addressing malnutrition, as well as increasing access to improved sanitation and hygiene interventions, are crucial priorities for Africa’s cities, for investing in the region’s health, and for achieving global health priorities.

As urbanization has increased, urban poverty and urban food inflation have increased simultaneously, leading to food insecurity for children in many African countries (Save the Children, 2012). Food insecurity can impact both the quantity and the quality of food available. For urban poor children, nutritional issues include inadequate consumption of macro and micro nutrient-dense foods, driven by food scarcity and/or poor quality of food. 1 in 3 children under-five in Africa were growth-stunted in 2011, with moderate to severe stunting in nearly 1 in 2 children in the lowest wealth quintile (Frayne, et al., 2012). Poor diet in childhood can lead to persistent nutritional deficits and a lifetime of physical and cognitive impairment. Setting priorities for sustainable, healthy cities necessarily means ensuring all children have consistent access to quality foods.

Additionally, the poorest urban-dwelling families often face insecure tenure in informal settlements and slums, where there may be limited or no access to clean drinking water, improved sanitation, or widespread hygiene issues (WASH). An estimated 58% of the urban population in sub-Saharan Africa does not have access to improved sanitation (UNICEF, 2014). Densely populated areas with inadequate infrastructure for ensuring proper sanitation and hygiene can lead to the spread of infectious diseases, e.g. parasitic infections and waterborne viruses. Interventions to address WASH in urban settings are crucial for preventing substantial childhood morbidity and mortality.

Together, nutrition and WASH challenges may have an interactive effect in terms of exacerbating poor health outcomes of urban poor children. For example, persistent or repeat clinical infection with communicable diseases transmitted through water and sanitation pathways and/or poor hygiene, e.g. schistosomiasis, cholera, or shigellosis, can lead to poor nutrition and poor nutrition can also make children more vulnerable to infectious disease resulting from poor hygiene and sanitation. Both undernutrition and poor WASH can result in adverse health outcomes including death, particularly in children under-five.

What is a “slum”?

UN-HABITAT defines a slum household as a group of individuals living under the same roof in an urban area who lack one or more of the following:

1. Durable housing of a permanent nature that protects against extreme climate conditions.
2. Sufficient living space which means not more than three people sharing the same room.
3. Easy access to safe water in sufficient amounts at an affordable price.
4. Access to adequate sanitation in the form of a private or public toilet shared by a reasonable number of people.
5. Security of tenure that prevents forced eviction

We are looking at all the urban poor in this analysis.
The terms “slum” and “informal settlement” are often used interchangeably in the literature.
Conceptual Framework

In Figure 1, below, we reproduce the USAID Multi-Sectoral Nutrition Conceptual Framework. This framework includes the crucial role of WASH in the enabling environment for optimal nutrition, and provides a way of thinking about the importance of both nutrition and WASH for the health of children in urban environments, explicated further below.

Figure 1: USAID Multi-Sectoral Nutrition Conceptual Framework (USAID 2014).

Direct pathways exist between WASH and nutrition diarrheal diseases, intestinal parasite infections, and environmental enteropathy. Diarrhea (caused by poor WASH) and undernutrition have an interactive relationship, in which diarrhea increases risk of undernutrition through loss of appetite, malabsorption of nutrients, and increased metabolism (Caulfield, Onis, Blössner, & Black, 2004; Petri et al., 2008). Undernourishment has a negative impact on children’s immune systems, making them more vulnerable to diarrheal disease. Poor sanitation may also result in soil-transmitted helminth infections, which are related to poor absorption of nutrition, blood loss, and appetite loss, impairing growth and often resulting in anemia (Brooker, Hotez, & Bundy, 2008; O’Lorcain & Holland, 2000). Environmental enteropathy refers to chronic pathogen ingestion resulting in inflammation and gut damage, and subsequent nutrition malabsorption (Humphrey, 2009). There have been some observational studies on associations between poor WASH and stunting, with one finding that open defecation was related to half of the variation in child height (Spears, Ghosh, & Cumming, 2013) another multi-country review found that increasing access to and use of improved sanitation and water sources was associated with reduced
risk of stunting (Fink, Günther, & Hill, 2011). Currently there are several integrated nutrition and WASH trials underway in rural Zimbabwe and Kenya, but the results have not yet been published. (Arnold et al., 2013; Sanitation Hygiene Infant Nutrition Efficacy (SHINE) Trial Team et al., 2015).

As African countries work toward safe, resilient, inclusive, and sustainable cities, solutions to the challenges posed by the confluence of nutrition and WASH issues in urban poor children are needed. A 2013 Cochrane review of 14 randomized and non-randomized WASH interventions to prevent undernutrition in LMICs suggested that WASH interventions which may provide a small growth benefit in children under-five include provision and utilization of soap and water quality improvements (UN Habitat, 2014). Other examples of nutrition sensitive interventions include school feeding programs, social safety nets, and cash transfers (UNICEF 2014 & Neervoort et al., 2013). Furthermore, nutrition specific interventions include micronutrient supplementation, supplemental feeding programs (children 6-59 months, pregnant and lactating women), promotion of optimal child feeding practices (exclusive breastfeeding 0-6 months, appropriate complementary feeding 6-24 months), and treatment and management of acute malnutrition (Ruel et al., 2013). Given the intersection of these issues, there may be opportunity to link existing childhood interventions or design future interventions which address nutrition, water quality, sanitation, and hygiene simultaneously. Evidence, on which interventions and policies have a greater impact on health outcomes, and knowledge of how they effect change, is needed. Further, gaps in knowledge need to be identified and addressed, in terms of improving the health of the poorest urban children. Solutions will require a multi-sectoral approach with leadership from an empowered health and WASH sector, drawing on data and available evidence to inform the way forward.

Reviewing the Evidence from East Africa

The following sections highlight the WASH and nutrition situation related to poor children (ages 0-5) living in urban settings in Uganda, Kenya and Tanzania. While the population of all three countries remains primarily rural, the urban population is increasing at a fast rate. Tanzania is the most urbanized, with nearly 1/3 of its population (32%) living in urban areas (WB 2015). The proportion is 26% in Kenya and 16% in Uganda. While Uganda’s urban population is a smaller share of the country than either Kenya or Tanzania, it is increasing at the fastest rate—an average of 5.43% per year over the last 5 years. Tanzania is close behind, with an urbanization rate of 5.36%, and Kenya, too, is increasing its urban population quickly, at a rate of 4.34% (CIA 2015). In each of these countries, the majority of the urban population live in areas that, using the UN-HABITAT definition provided above, qualify as slums. The proportion is highest in Kenya, 56%, but not much lower in Uganda (54%) and Tanzania (51%) (WB 2015).

Table 1, below, uses data from the Demographic and Health Surveys¹ and provides an overview of urban population characteristics and nutrition and WASH-related indicators.

¹ Data come from the most recent final reports available for each country: Uganda (2011), Kenya (2014), Tanzania (2016).
Table 1: Background Statistics

<table>
<thead>
<tr>
<th>Background Statistics</th>
<th>UGANDA</th>
<th>KENYA</th>
<th>TANZANIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Female-headed households</td>
<td>29.5 (National); 29.2 (Rural); 31.0 (Urban)</td>
<td>32.2 (National); 35.8 (Rural); 27.3 (Urban)</td>
<td>24.5 (mainland); 24.0 (Zanzibar); 22.1 (mainland); 22.1 (Zanzibar)</td>
</tr>
<tr>
<td>% Women aged 15-19 who have begun childbearing</td>
<td>24.8 (National); 26.7 (Rural); 18.8 (Urban)</td>
<td>18.1 (National); 18.5 (Rural); 17.3 (Urban)</td>
<td>26.7 (National); 31.6 (Rural); 18.5 (Urban)</td>
</tr>
<tr>
<td>Literacy (%)</td>
<td>77.5 (men); 64.2 (women)</td>
<td>74.1 (men); 58.8 (women)</td>
<td>91.1 (men); 86.0 (women)</td>
</tr>
<tr>
<td>% of population with no education</td>
<td>12.5 (men); 19.9 (women)</td>
<td>13.5 (men); 22 (women)</td>
<td>6.6 (men); 8.2 (women)</td>
</tr>
<tr>
<td>Nutrition Related Statistics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stunting</td>
<td>28.9 (men); 30.2 (women)</td>
<td>23.5</td>
<td>26.0</td>
</tr>
<tr>
<td>Wasting</td>
<td>3.6 (men); 3.7 (women)</td>
<td>2.9</td>
<td>4.0</td>
</tr>
<tr>
<td>Underweight</td>
<td>10.5 (men); 11.2 (women)</td>
<td>7.5</td>
<td>11.0</td>
</tr>
<tr>
<td>Overweight</td>
<td>1.6 (men); 1.6 (women)</td>
<td>1.9</td>
<td>1.4</td>
</tr>
<tr>
<td>Percentage of children under 2 currently breastfeeding</td>
<td>45.8</td>
<td>53.1</td>
<td>85.1 (mainland); 85.0 (Zanzibar)</td>
</tr>
<tr>
<td>Minimal acceptable diet</td>
<td>5.8 (men); 5.1 (women)</td>
<td>10.1</td>
<td>21.8</td>
</tr>
<tr>
<td>WASH Related Statistics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% of households with source of drinking water improved</td>
<td>70.3 (men); 65.6 (women)</td>
<td>90.6</td>
<td>71.3</td>
</tr>
<tr>
<td>% of households with sanitation facility improved and unshared</td>
<td>16.4 (men); 15.3 (women)</td>
<td>20.9</td>
<td>22.7</td>
</tr>
<tr>
<td>Prevalence of diarrhea in children under 5</td>
<td>23.4</td>
<td>23.7</td>
<td>21.8</td>
</tr>
</tbody>
</table>
While nutrition outcomes tend to be better in urban areas than in rural ones, urban children are more likely to face the double burden of malnutrition compared to rural children, because they are more likely to be overweight. For example, children in urban Tanzania are twice as likely as children in rural areas to be overweight, while they are about 80% as likely to be wasted as rural children.

Children in urban settings are also more likely than rural children to have access to an improved source of water and an unshared, improved sanitation facility, but these statistics may hide some disadvantages for urban children, as discussed below. For example, the overwhelming majority of urban children do not have access to unshared toilet facilities, and public, shared facilities are often too far or too dirty for use.

**Methods**

Our review of both the nutrition and WASH literature related to urban child health in East Africa was an iterative process. Initial searches included all of sub-Saharan Africa, but was later narrowed to focus specifically on Uganda, Kenya, and Tanzania. We focused on published and grey literature from the last 10 years, although earlier resources that provided particularly good information on our target areas and countries were also included. The evidence presented here reflect the preliminary findings with the intention of identifying gaps and expanding this analysis moving forward after this roundtable.

In addition, the Steering Committee did a preliminary map of the current key players, interventions and underway to address nutrition and WASH needs. These tables are included in an appendix.

**Evidence from Uganda**

**General Overview**

Uganda is a landlocked equatorial country in eastern Africa with a population of approximately 39 million. It covers around 250,000 square kilometers of land and is divided into 112 administrative districts. Uganda is ethnically diverse, but may be roughly divided into the Bantu-speaking majority and non-Bantu-speaking minority (Uganda: Standard DHS, 2011).

While Uganda is primarily a rural country, urban areas are growing rapidly. As of 2010, approximately 4.5 million of Uganda’s population of 32 million (14%) lived in urban areas.

Free Stock Image: Uganda’s Kampala slum
and by 2016, the urban population had risen to 16% of the total population (WB 2015). Kampala is both the capital city and the country’s largest city, with 1.7 million inhabitants. Gulu, the second largest city in Uganda, is approximately one third the size of Kampala. While the proportion of urban residents remains low compared to global averages, it has increased approximately 350% since 1980, leading to challenges for policy makers. Sustained economic growth and newly peaceful conditions have contributed to the rapid pace of urbanization, particularly in Kampala. While economic growth has been high and sustained, the absolute numbers living in poverty have not declined (Uganda Urban Housing Profile). Income inequality has been increasing, and is higher in urban areas than in rural ones (UNICEF, 2015).

With this increase in urbanization urban slum areas are also growing, with “slum-like” conditions in urban areas seeing an increase from 34% in 2002/03 to 43% in 2012/13. Using UN-HABITAT definitions, nearly 70% of Uganda’s urban residents live in overcrowded conditions 26% of the urban population lives in temporary housing, 14% in semi-permanent, and 60% in permanent structures. Approximately 47% of urban dwellers live in rented tenements, 31% in detached dwellings, 18% in semi-detached dwellings, and 4% in some other type of housing unit. In Kampala, 91% of residents used bricks in construction, while in Gulu this proportion was only 9% (WHO-UN Habitat 2010). A range of actors, including national and local governments, community partners, private enterprises, individuals, and international donors, are involved in urban planning and meeting the challenge of insufficient housing. The numerous actors involved in urban planning result in a patchwork of efforts and lack of clarity surrounding priorities and responsibilities.

While children living in rural areas are significantly more likely to be poor than children in urban areas, the often unplanned nature of developments in cities result in concentration of disadvantage among the most vulnerable populations, including street children. Some of the risks urban children face include unsafe shelters, environmental degradation, a lack of land rights, contaminated water and sanitation facilities, and community violence (UNICEF 2015).

The National Urban Policy is centered on providing a framework targeted at improving the administrative and legal environment for urban planning, and recommendations include focusing on Kampala (rather than on secondary cities), slum upgrading projects should respond to multidimensional needs of the poor, urban poverty nutritional security, and gender need greater focus in Uganda’s policy environment (Brown, 2013).

**Nutrition Landscape**

In Uganda, nutrition is generally better in urban areas than rural ones. For example, 23.5% of urban children are stunted and 2.9% wasted, compared to 30.2% and 3.7% respectively for rural children (Uganda: Standard DHS, 2011). However, national poverty reduction plans mainly targeted rural areas until the development of the National Urban Policy which included food security polity (Brown, 2013).

There are few resources on urban child nutrition in Uganda, but the major ones we found in our search of the literature are:

1. The National Urban Policy (Brown 2013) is centered on providing a framework is targeted at improving the administrative and legal environment for urban plans. Recommendations include:
✓ Focus on Kampala (rather than on secondary cities).
✓ Slum upgrading projects should respond to multidimensional needs of the poor.
✓ Urban poverty nutritional security, and gender need greater focus in Uganda’s policy environment.

2. In 2012, ACF conducted a study to understand factors related to food security, nutrition, and livelihoods in Kampala (Dimanin, 2012).
   a. Methods: Investigators used semi-structured interviews with government representatives and civil society organizations as well as questionnaires administered to 45 households in each of three separate slum areas.
   b. Key findings:
      ✓ Very little information exists about the urban poor in Uganda.
      ✓ 57% of survey respondents (slum dwellers) indicated that they had not been able to access health services as often as they needed.
      ✓ 70% of households surveyed had poor dietary diversity and most indicated some degree of food insecurity, including 67% of households that felt some anxiety and uncertainty about food supply, 95% experienced a form of insufficient food quality, and 86% experienced insufficient intake.
      ✓ 93% of households had only one source of food, which was mainly purchased food.
      ✓ Respondents’ main concerns include flooding and lack of free toilets
      ✓ Potential interventions: increased access to urban agriculture, credit and savings, livelihoods and income generating activities; proper enumeration of the slum populations and ongoing monitoring to address the lack of data.

   a. Methods: a cross-sectional study of 296 households. 215 were farming households and the rest non-farming. Data collection took place near the end of the post-harvest season.
   b. Key Findings:
      ✓ Household food security was associated with assets, primary caregiver education, and area of land farmed.
      ✓ Food security was also associated with child dietary diversity and weight-for-age z score.
      ✓ Children from families who did not grow livestock had lower dietary diversity scores, and generally children of farming families had non-statistically significant trends toward better food and nutrition security indicators.
      ✓ More research is needed to understand the pathways by which urban farming and livestock production improve household food security and child diet and nutritional status.

WASH Landscape

While urban areas have better access to improved water (90.6% to 70.3%) and private, improved sanitation (20.9% to 15.3%) compared to rural areas, access to improved water and sanitation has actually decreased in urban areas in the last few years, due primarily to increased population. Weak water network management and poor urban planning are contributing to the lack of progress on
improving water access in urban areas (UN-Water global analysis and assessment of sanitation drinking water report, 2015). Most city residents use septic tank latrines and dry latrine options such as pit latrines (most common among the poor) and EcoSanS (composting). Urban slum/densely populated latrines are poorly built, full, and poorly maintained. No guidelines exist for latrine construction. The number of people using communal latrines ranges from 8-100 families per toilet (WB, 2010 citing Advani, 2008 study). Pits, when full, are emptied by “cesspool emptiers” which dispose of waste at a centralized sewage treatment plant (WSC at Bugolobi in central Kampala).

More has been published on WASH than nutrition in Uganda, although there are still considerable gaps in our knowledge about WASH and child health in urban areas. Our review identified the following information:

1. **Key findings on toilet use in urban areas, mainly Kampala, include:**
   - Use of plastic bag “flying toilets” for defecation is common and preferred by some to having to use poorly cared for, distant public latrines (Kwiringira 2016)
   - These pose environmental threats, especially to children who play in gutters and other areas where the bags are disposed (Kwiringira 2016).
   - Barriers identified to latrine use in urban slum areas were access issues for women and children, especially at night, as often latrines are located at great distance from houses (Kwiringira, Atekyereza, Niwagaba, & Günther, 2014). There is also seasonal variation, with less use during rainy seasons (Kwiringira, 2016).
   - A 2010 case study found that the majority of residents in Kampala in the urban slum area of Bwaise III (75%) used a shared toilet (Katukiza, et al., 2014).
   - When shared latrines are not well cared for and regularly cleaned, people revert to the practice of open defecation (Kwiringira, et al., 2014).
   - Less than half of latrines (47%) in urban areas are clean enough to use and 45% are abandoned (Kwiringira, et al., 2014).

2. **Key findings on waste water treatment:**
   - Overall, the compliance with national waste water treatment facility standards is low.
   - The Bugolobi wastewater treatment plant/network has not been upgraded since 1965 and is both low capacity and in need of major renovations (WB, 2010 - cited Advani, 2008).
   - Waste that is removed from septic tanks and latrines is often illegally disposed of, emptied into bodies of water/streams, placing households and the environment at risk of further contamination (World Bank, 2010).
   - Overall, there is insufficient fecal sludge removal capacity to meet demand. Many emptiers lack oversight and are unlicensed. (World Bank, 2010)
   - In an often-referenced multi-country cross-sectional research conducted in 1996, which included Uganda and seven other countries, sanitation improvements were linked to more significant benefits than improvements to water. (Esrey, 1996)

3. **Limited research is also available on hygiene practices in urban areas, but some is available.**
   - There is some indication that slum dwellers view child feces is harmless and therefore open defecation among children is not a problem. In addition, some noted that child feces needs to be seen to determine if the child is healthy; therefore they do not want children to use latrines (Kwiringira, et al., 2014).
   - One study that was conducted in Kenya, Tanzania and Uganda found that urban latrines were more “contaminated” in Kenya and Uganda than in Tanzania and those households
identified to have greater wealth and more educated had more improved latrines and less “fouled latrines” (not defined) (Tumwin et al 2002).

Evidence from Tanzania

General Overview
Tanzania lies south of the equator and is the largest country in eastern Africa, covering 940,000 square kilometers. The population is approximately 50 million, of whom approximately 1/3 live in urban areas. Of the countries discussed here, Tanzania is the fastest urbanizing, with an urbanization rate of 5.36% (Tanzania: Standard DHS, 2016). Tanzania has a low population density overall, and even in Dar es Salaam, the capital, the population density is over 1,000 people per square kilometer lower than Kampala or Nairobi.

Nutrition Landscape
Once again, studies specifically addressing urban child health in Tanzania are rare.

1. **Juma et al. (2016)** conducted a study to assess prevalence of undernutrition among children.
   a. **Methods:** They compare children seen at Bagamoyo District Hospital, an urban setting, with children seen at three rural health facilities. A total of 63,237 children were assessed.
   b. **Key Findings:**
      ✓ Stunting prevalence was 8.37%, underweight prevalence was 5.7%, and wasting prevalence was 1.41%.
      ✓ Children from urban areas had lower rates of stunting, underweight, and wasting compared to children from the rural areas. This is consistent with Tanzania national household surveys that indicate that rural populations have higher rates of undernutrition.

2. **Pillai et al (2016)** carried out a study in Morogoro municipality to assess the effect of a nutrition education intervention for families with home gardens.
   a. **Methods:** A baseline cross-sectional survey was conducted in October/November 2013 and an endline survey in May/June 2014. The intervention consisted of three interactive nutrition education sessions in December 2013, targeting 40 households owning home garden. Topics covered by education sessions included the importance of balance meals and dietary diversity, specific vitamins (A, B, and C) and iron.
   b. **Key Findings:**
      ✓ Knowledge about the importance of vitamin A and iron consumption increased, but these results were not statistically significant.
      ✓ The authors conclude that nutrition education for families with home gardens can improve household diets, but dietary intake was not measured. Yet nutrition education combined with agriculture remains a promising intervention for improved nutrition in urban settings.

3. **Kulwa et al. (2006)** conducted a study in Ilala Municipality, Dar-es-Salaam region in December 2003 to determine barriers to optimal child care practices and child nutritional status.
a. Methods: Households with children 6-23 months of age were selected randomly, with a total of 33 from Buguruni, 34 from Vingunguti, and 33 from Tabata participating.

b. Key Findings:

- Most (75%) mothers were married, and almost half of the mothers worked full-time, mostly in small business or as traders in local markets, although 27% were formally employed as teachers, nurses, or bar/restaurant attendants. Mothers worked on average 10 hours a day, and almost 60% employed alternative care takers while working.
- Child undernutrition was highly prevalent, with rates of stunting at 43%, underweight at 22%, and wasting at 3%.
- Only 9% of mothers reported that their children had been exclusively breastfed from 0-6 months. 78% were still breastfeeding, and among children not breastfeeding, the mean duration of breastfeeding was 12 months.
- More research is needed to understand the role of alternate caregivers and how to children’s diets when mothers are in urban settings.

**WASH Landscape**

Unlike Uganda and Kenya, Tanzania reports that access to improved water in urban areas has been improving (from 78% in 1990 to 96% in 2015), although there have been only limited changes in access to sanitation in urban areas 29% (2015) compared to 1990 (28%) (UNICEF/WHO, 2015). Limited increases are attributed to rapid urbanization. It’s not known, based on review of articles/reports, what has contributed to the increases in water access.

Our review of the literature on WASH in Tanzania revealed the following:

1. On household sanitation the key findings are:
   - Among households in urban areas 44% share latrines, which the Joint Monitoring Program (JMP) do not considered as “improved sanitation” (Jenkins, Cumming, & Cairncross, 2015).
   - Similar to Uganda, shared latrines are often more likely to be unclean, inaccessible, particularly for women and children and at night, and therefore not used (Jenkins, et al., 2015).
   - Pit latrines are the most common type of latrines in unplanned urban settlements in Tanzanian urban areas (Jenkins, et al., 2015).
   - No comprehensive sewer network exists in Dar es Salaam. The most common type of unimproved latrines in urban areas in mainland Tanzania are open pit latrine or pits without a slab (37%) (Republic of Tanzania Ministry of Finance, 2012).
   - A study looking at the extent of fecal contamination of household floors of peri-urban Bagamoyo households found no differences in level of fecal contamination between the use
of the two types of latrines households used, but only looked at 20 households and did not consider all potential pathogenic contaminants (Pickering, et al., 2012).

✓ The economic burden of poor sanitation is mostly felt among the poor; the poorest quintile is 41 times more likely to practice open defecation than the wealthiest quintile (WSP 2016).
✓ Poor sanitation costs 301 billion Tanzanian Shillings (US 206 million) a year, approximately 1% of GDP (WSP, 2012 citing In-country e-Thekwini monitoring, 2011).

2. Fecal sludge management (FSM) among densely populated poor urban areas is significant sanitation challenge (WSP, 2016). A study from data collected in 2008 looked at current FSM practices among 662 residential properties across 35 unplanned sub-wards in Dar Es Salaam (Jenkins, et. al 2015). The study covered willingness to pay (WTP) and use of a relatively new fecal sludge extraction technology, the “gulpher,” used to extract waste from pits in densely neighborhood, as well as five other different methods for pit emptying. The authors found:
✓ Households delay desludging as long as they can, use full pits when unsafe, that the cost to empty is high for poor households and that typical practices are unhygienic.
✓ Less than 2% of the households in the survey were connected to a sewer system or a septic tank.
✓ Income was highly correlated with methods used for desludging, with the lowest income quintile 85% less likely to use a hygienic method and four times more likely to use “flooding out” a method. This releases sludge into the community, often timed with heavy rains, posing substantial environmental risks.
✓ If households have space on their property instead of desludging they will just dig a new pit.
✓ Residents identified poor household sanitation (24%) (flooded latrines, poor quality of latrines and lack of government involvement), poverty (56%), poor drainage, flooding, high water table, lack of clean water (29%) and security (24%) (Pauschert, Gronenmeier, and Brueback (2012).

3. There are numerous challenges facing the water system in Tanzania, including:
✓ 75% of urban populations among 19 cities in Tanzania live in Low-Income Areas (LIAs), and of those only 23% have access to reliable water supply (Pauschert, et al 2012).
✓ Gaps in access are fulfilled in part by Informal Service Providers (ISP), reported to serve 68%

Photo Credit: WaterAid Tanzania
of LIAs with trucked water (unimproved by JMP definition), which charge 13 times more than public service providers for the lowest income areas. The water quality of ISP provided water is unknown and unregulated (Pauschert et al 2012).

- A “worn, insufficient” system covering public and private water supply in Dar es Salaam with increasing “environmental health problems” is described, most of the challenges are attributed to urban growth and sprawl (Kjellén, 2006).
- Women and children, particularly female children, carry the largest burden in terms of time spent on the collection of water (Kjellén, 2006).
- A high proportion of urban Tanzanians depend on packaged water as people perceive that it is more safe than public piped water (Kassenga, 2007).

4. Limited research was identified on hygiene behavior as well as impact of WASH on child health, however:
- Pauschert, et al. (2012) reported that among households surveyed 60% reported their children hardly suffer from diarrhea, with 81% of the households where diarrhea occurs frequently not having a domestic water connection (this was self-reported data and how the question was asked, the time frame for incidence or the age of children was not indicated).

5. While an in-depth look at the links between WASH and child health outcomes is outside the scope of this landscape analysis, we do include some findings on cholera:
- Between 2006 and 2009 the response to cholera outbreaks in Tanzania is estimated to have cost 3.8 million USD, although it is unknown what proportion of these costs were borne by urban areas (WSP, 2012).
- During a 2006 cholera outbreak, the incidence was highest among poor informal settlements in Dar es Salaam (63% of total cases and 40% of all deaths) (Penrose, et al., 2010).

**Evidence from Kenya**

**General Overview**

Kenya’s population was estimated to be about 38.6 million in the 2009 census, and is rapidly growing, increasing at a rate of approximately 1 million per year in the decade prior to the census. The largest ethnic groups are the Kikuyu and Luhya, while other major ethnic groups include the Luo, Kamba, and Kalenjin. (Kenya DHS 2014, 2015).

Close to 40% of Kenya’s population live in urban areas, and approximately 65% of GDP is generated in cities and towns. The urban population is growing at an annual rate of 4.4%, one of the highest in the region. 71% of the urban population live in slums, which are characterized by insecure land tenure and poor hygienic conditions. Urban poverty is rising faster than the poverty rate in the country overall. In 1992, 29.3% of the urban population lived in poverty, while by 1997, that proportion had grown to 49.2% (Neervoort, et al., 2013).

Nairobi, with an estimated population of over 3 million, is the most populous city in East Africa. It covers nearly 700 square kilometers of land and is comprised of 8 administrative districts. While a hub for industry and trade, Nairobi also contains some of the world’s most densely population, unsanitary, and insecure slums, with over 100 informal settlements throughout the city. While urban/rural statistics...
often show a health advantage for city dwellers, this hides the health disadvantages of the urban poor (APHRC 2014).

According to the 2014 DHS, 68.4% of urban dwellings have electricity and 70% have concrete floors; these numbers are significantly higher than those for rural residences. While many health outcomes are better for urban dwellers than rural residents, this does not hold true for slum dwellers in Nairobi. The health of those living in slums has improved since tracking began in 2000, but health outcome averages remain below those in Nairobi and Kenya more broadly (APHRC 2015). 65.8% of children in Nairobi were fully immunized, but the proportion of fully immunized slum dwellers is only 44%. Child mortality was 52 per 1000 live births in Nairobi in 2014, but in slums (in 2012), the under-five mortality was 80 (APHRC 2015). However, child mortality in Nairobi slums is comparable to other urban areas in Kenya, and slightly lower than in rural Kenya (APHRC 2014). Total child mortality is highest among the Luo ethnic group, while infant mortality is highest among the Luhya (APHRC 2014). Child mortality declined between the 2000 round of the NCSS and NCSS 2012, and the gap between child mortality in informal settlements in Nairobi and Nairobi generally narrowed during this period. Reasons for the decline include more deliveries in health facilities, improved immunization coverage, improved household sanitation, and improved access to treatment for childhood fever. Informal settlement residents cited lack of safe drinking water and poor drainage as the most important problems they face in the 2012 iteration of the Nairobi Cross-sectional Slums Survey (NCSS 2012) (APHRC 2014).

**Nutrition Landscape**

There is considerably more research on nutrition in Kenya than in the other two countries included in our review; therefore, we have broken down the nutrition landscape into multiple categories, starting with a broad look at nutrition.

1. The World Food Programme conducted a Comprehensive Food Security and Vulnerability Analysis (KU-CFSVA) and Nutrition Assessment in high density urban areas (Nzuma & Ochola 2010).
   a. Methods: The investigators used mixed methods to study 3,900 households, selected randomly from populations in 9 livelihood clusters across Kenya.
   b. Key Findings:
      ✓ Households in high density North Western Pastoral and North Eastern Pastoral livelihoods clusters had the poorest indicators, while the rate of acute malnutrition was in line WHO acceptable rates (<5%) in all livelihoods clusters except Pastoral.
      ✓ Rates of stunting were above 20% in all livelihoods clusters except for NE pastoral.
      ✓ In all areas IYCF indicators were poor, specifically for feeding frequency, dietary diversity,
and exclusive breastfeeding.

- The northwest Pastoral zone had the highest proportion of households with poor or borderline Food Consumption Score (an indicator of food insecurity), followed by Nairobi and Coastal Marginal zones.
- The assessment noted the increase in informal day care centres in urban area, and the need for improvements with regards to hygiene standards, sleeping, and play facilities at such centers. Street foods are cheap and readily available in urban settings but are often prepared in unhygienic conditions.
- Variables associated with child nutritional status were child morbidity, sanitation, and ownership of assets and wealth.
- The authors recommended increased coverage and documentation of Vitamin A supplementation and de-worming, provision of long-lasting insecticide treated bed-nets to children under five years of age and pregnant mothers for malaria prevention, and sensitization on health seeking behavior for parents of sick children, as well as optimal breastfeeding and complementary breastfeeding practices and hygiene. Government guidelines and supervision of day care centres are needed, as well as inspection and regulation of street food vendors.

   a. Methods: The authors used quantitative data from the Nairobi Urban Health and Demographic Surveillance System (NUHDSS), which tracks 70,000 individuals in Nairobi slums (Korogocho and Viwandani). The data were collected between March 2011 and January 2012 from 3000 randomly sampled households. They also used qualitative data from focus groups and key informant interviews with community members and opinion leaders.
   b. Key Findings:
      - Because these are not legal settlements, provision of services is a complex issue.
      - Half of households were severely food insecure and 85% had some food insecurity.
      - Respondents had little choice with regards to food consumption, only consuming what is available.
      - After the 2007/2008 postelection violence in Kenya, prices of staple foods like maize flour doubled, reducing household purchasing power.
      - Respondents used coping strategies such as reducing food variety and quality, scavenging, and eating street foods.
      - Increasing resilience of urban slum dwellers in the face of shocks and acute crisis is important to consider for improving food security.

3. Another study by Kimani-Murage et al. (2011a) used data from NUHDSS to evaluate food security and nutritional outcomes among urban poor orphans.
   a. Methods: Data on 1,235 children 6-14 years of age was collected between January and June 2007.
   b. Key Findings:
      - Orphans living in informal settlements were more food insecure than non-orphaned children.
      - Children without both parents were not the most vulnerable, as those who were paternal orphans had the lowest scores for food security. Children may have been adopted into other households after losing both parents, and the study found that children and orphans...
living in households headed by another relative had higher food security scores.
✓ The study also assessed children’s nutrition status and found no significant association between orphan status and nutritional status.
✓ No data were available on when the children became orphans (which would be important to consider as the authors considered stunting as an outcome, for which children are most vulnerable between 0 and 2 years of age).

4. Abuya, Ciera, & Kimani-Murage, (2012) used NUHDSS data to analyze factors related to stunting. They found:
✓ The prevalence of stunting was close to 42% among children up to 42 months of age.
✓ In multivariate models, low maternal education was a significant predictor of stunting in this context.

5. Olack et al. (2011) investigated prevalence of undernutrition, as well as child feeding practices and food security in Kibera, Nairobi, among children 6-59 months of age.
a. Methods: Kenya Medical Research Institute/Centers for Disease Control and Prevention operate population-based surveillance in Kibera. The study occurred after the post-election violence of 2007-2008. 1,310 children were included in the sample.
b. Key Findings:
✓ 47% of children were stunted, 11.8% were underweight, and 2.6% were wasted.
✓ Older children (36-47 months) had the highest prevalence of stunting, while children 6-11 months had the highest prevalence of wasting.
✓ The high prevalence of stunting indicates that chronic undernutrition was a more significant problem than acute malnutrition related to the political crisis, and more focus should be spent on preventing stunting among the urban poor.

a. Methods: The authors conducted interviews and focus groups with health care providers, religious leaders, traditional birth attendants, youth leaders, women’s group leaders, young and older mothers, CHWs and community elders.
b. Key Findings:
✓ Mothers felt they were unable to breastfeed if they were undernourished.
✓ Early introduction of complementary foods and poor quality of foods were related to lack of knowledge.
✓ Mothers have to work, and children are not fed the entire day when mothers are away. Mothers stop breastfeeding when they leave infants during the day, and other caregivers replace milk with water, porridge, or other foods.
✓ Day care centers have unqualified staff and are overcrowded, and are considered to be dirty.
✓ There is a lack of access to family planning.
✓ Poor access to water and sanitation was common, and children are allowed to play in the gutters and thus exposed to bacteria.
✓ Alcoholism is a major problem among slum residents including mothers, and sometimes leaves mothers unable to care for their children.
✓ Children often ate food from dumpsters, and consumption of unhygienically prepare street food was common.
Potential interventions outlined were related to child care, street food consumption, family planning, substance abuse, WASH and MIYCN targeted to slums.

The Risk of Over Nutrition
In addition to a high prevalence of undernutrition in urban areas in Kenya, there is growing recognition of the increased risk of overweight and obesity among children, particularly school-aged children, and growing evidence of a double burden. While, overall nutrition indicators are better for urban children than rural ones, urban children are more likely than their rural counterparts to be overweight (2.4% to 0.9%) (Kenya Demographic and Health Survey 2014, 2015).

1. In 2010, data were collected from 3,335 children under five in Korogocho and Viwandani slums, part of the NUHDSS (Kimani-Murage et al., 2015a). Key findings are:
   ✓ 46% of children were stunted, 11% were underweight, and 2.5% were wasted, and the prevalence of overweight/obese children was 9%.
   ✓ The authors found that the double burden occurred at the household level, with 43% of 37% of mothers of stunted children overweight and obese, respectively.

2. (Kigaru, Loechl, Moleah, Macharia-Mutie, & Ndungu, 2015) conducted a study on nutrition knowledge, attitudes, and practices among 202 school-aged children (8-11 years old) from four public primary schools in Nairobi (Kasarani sub-County).
   a. Methods: The study was cross-sectional and used a structured questionnaire, head teacher key informant interviews, and focus group discussions for data collection.
   b. Key Findings:
      ✓ Half of children had moderate knowledge, and one-third had low knowledge of nutrition.
      ✓ Around 65% of children said that they were not concerned with the foods they ate since they were still young, and many reported consuming sweetened drinks frequently with only 10% consuming fruit 4 to 7 times the previous week. Commonly preferred snacks were potato chips, chocolate, case, sausage, and popcorn.
      ✓ The majority of children brought their lunch to school, and most shared with other children. Almost all children brought money to school to purchase snacks. At home, children often ate in front of the television and unsupervised by parents.
      ✓ The study found that nutrition knowledge had no significant relationship with dietary practices, although attitude was associated with consumption of sweetened beverages, consumption of fast foods, and consumption of fruits.
      ✓ The authors recommend increased social and behavior change communication on the effect of poor dietary practices on overweight/obesity and associated health risks, as well as engage parents in monitoring children’s eating behaviors and food purchases.

3. Another analysis, which focused on children 3-5 years of age, used data from Kenya’s 2003 DHS (Gewa, 2010). The objective of the study was to assess prevalence of child overweight and obesity among Kenyan (both urban and rural) pre-school children, and their association with maternal and early child nutritional factors. The authors found that:
   ✓ Children in urban areas had 31% higher odds of being overweight or obese than rural children, but this difference was not statistically significant.
   ✓ Maternal overweight and obesity was significantly associated with odds of child overweight/obesity, as was being larger at birth and maternal attainment of primary and secondary school education.
Child Feeding and Care Practices in Urban Areas

1. Data from the NUHDSS was also used to assess child feeding and care practices in urban Kenya, finding:
   - Urban poor in Kenya have poor IYCF practices, including 40% of infants not being fed within the first hour after birth, 2% exclusively breastfed for 6 months, and 15% stop breastfeeding by the end of one year (Kimani-Murage et al., 2011b).

   a. Methods: In April 2012, the authors conducted 19 in-depth interviews, 10 focus group discussions, and 11 key informant interviews conducted using open-ended questions.
   b. Key Findings:
      - Most mothers had generally adequate knowledge of optimal breastfeeding practices, with respondents aware of benefits of immediate initiation of breastfeeding after birth and EBF for 6 months. However, there were barriers to EBF that made it impractical for them despite knowledge.
      - Duration of breastfeeding was highly variable with the shortest duration reported by young mothers, working mothers, and mothers participating in commercial sex work.
      - Mothers had to return to work soon after giving birth, and often leave infants with siblings, other relatives, neighbors, or at sub-standard day care centers.
      - Breastmilk substitutes such as cow milk were often left for babies regardless of age, and mothers employed in commercial sex work had difficulty breastfeeding and found it too time consuming.
      - Other barriers to breastfeeding were that people lived in small one-room houses that do not provide a good environment for BF.
      - Food insecurity and poor maternal nutritional status were perceived to make it more difficult to breastfeed, and young/single mothers often reported to fear that breastfeeding would cause their breasts to sag.
      - Overall there was a lack of social support, with women in slums having no one to help with daily chores, and a lack of knowledge of optimal practices.
      - Some mothers were afraid to breastfeed because of their (unknown) HIV status and or felt that exclusively breastfeeding would stigmatize them as being HIV+.
      - The authors recommend both community and individual level BCC as well as macro level policies and intervention, including revision of labor laws regarding maternity leave, increased social protection, adequate child care facilities, increased support for milk expression, MIYCN training in school curricula, and increased youth-friendly family planning services.
3. Another study on child feeding practices aimed to assess the nutritional status of children enrolled in daycare centers in urban slums (Mwase, et al 2016). Key findings include:
   ✓ Five centers, all consisting of a single room, were evaluated. They were semi-permanent structures with iron sheet walls and poor ventilation, and used shared pit latrines. Water was sourced through purchase from a public tap. Attendance ranged from 10-30 children with on average one caregiver per 10 children.
   ✓ Most children brought food from home, which was mostly carbohydrate based and lacking in micronutrients and animal-source protein. The authors observed non-responsive feeding practices, and, with the exception of a few mothers who came to lunch, the feeding was done by the staff. Lunch was the only meal served.
   ✓ All children were 6-24 months of age, and 40% had some form of undernutrition, with 1/3 stunted, 1/3 underweight, and 12% wasted.
   ✓ There was a statistically significant negative correlation between height-for-age z scores and number of hours per day the mother worked outside the home, however household care resources (paternal marital status, educational level, occupation, income, household size, asset ownership) were found to have no association with child nutritional status in the analysis.
   ✓ Child care centers would benefit from increased funding, supervision, and collaboration with government agencies and NGOs in slum settings.

Nutrition Interventions

As more research has been done on nutrition topics in urban Kenya than in Uganda or Tanzania, it is not surprising there is also more research on nutrition interventions in urban Kenya.

1. Kimani-Murage et al. (2016) conducted a study to evaluate effectiveness of community health workers promoting breastfeeding in slum settings. Key findings include:
   ✓ The odds ratio for exclusive breastfeeding was higher in all groups (MIYCN-intervention, MIYCN-control, and Comparison group) compared to the pre-intervention group at 2, 4, and 6 months.
   ✓ Any CHW visit, regardless of MIYCN content, had an effect on EBF.
   ✓ Incentivizing and supervising CHWs to conduct home-based counselling may be effective in promoting EBF in urban poor settings.

2. A cluster randomized controlled trial was conducted in Kibera slum to evaluate the impact of facility and home-based counselling to promote exclusive breastfeeding.
   a. Methods: There were two intervention groups (home-based intensive counselling and facility-based intensive counselling) and a control group (Ochola, Labadarios, & Nduati, 2013). The home-based group received seven home counselling sessions, both antenatally and postnatally. The facility based group received only one session antenatally. Data on infant feeding was collected monthly. There were 360 women who were enrolled, at 34-36 weeks pregnant, with 120 in each study group, and 265 completed the study.
   b. Key Findings:
   ✓ After 6 months of follow up, mothers receiving home-based counselling had a prevalence of exclusive breastfeeding of 23.6%, mothers receiving facility-based counselling had a prevalence of 9.2%, and control group mothers had a prevalence of 5.6%.
The home-based group was four times more likely to practice exclusive breastfeeding, while no statistically significant differences were found between the facility-based group and control group.

Prevalence of exclusive breastfeeding remained low despite the intervention, indicating that changing knowledge and attitudes through counselling may not be an adequate approach given the other barriers to exclusive breastfeeding in urban slums that have been identified.

3. Neervoort et al (2013) conducted an evaluation of a school feeding program was conducted to assess its effect on child nutritional status and anemia.
   a. Methods: This study took place from 2009-2010 among 148 children attending the St. George primary school in Kibera slum, in Nairobi. The intervention assessed was a school feeding program that was implemented for one year, and consisted of lunch combined with health education, and vitamin or iron supplementation for three months. The control groups were children enrolled at the same school, but did not receive the feeding program, health education, or supplementation.
   b. Key Findings:
      ✓ None of the children were wasted at the end of the intervention, compared to 9 children in the control group (11%), and this difference was statistically significant.
      ✓ Significant differences were also found between groups in anemia and underweight prevalence.

4. UNICEF and Concern Worldwide has supported the Ministry of Health in Kenya to increase nutrition interventions in urban settings. (Beyer, Wambani, & Kyalo, 2013).
   a. Methods: Sentinel site surveillance for urban areas by Nairobi Urban Health and Demographic Surveillance System (NUHDSS) was set up, and SQUEAC surveys were implemented to highlight barriers for strengthening response.
   b. Key Findings:
      ✓ Coverage of high impact nutrition interventions at the facility level was found to be 89% of target in 2012, and outpatient therapeutic programs were 40-50% of target as of 2012 in Nairobi.
      ✓ MIYCN interventions such as Trials for Improved Practices, Mother to Mother Support Groups, and Community Capacity Enhancement approaches have been implemented in Nairobi and Kisumu from 2010-2012.
      ✓ Challenges and constraints to implementation were identified as inadequate resources at all levels, few partners available to support urban nutrition, transient populations, working mothers and un-regulated day care settings, insecurity, and social challenges like HIV/AIDS, substance abuse, and violence.

5. In a Kenya case study that was part of a larger review, Mohiddin, Phelps, & Walters (2012) found the following:
   ✓ Stunting was found to be higher in informal settlements compared to the national average, and there were high levels of inequality between rural and urban areas, with the difference in child undernutrition between the wealthiest and poorest households was twice as large in urban compared to rural areas.
   ✓ The NGO Concern reported that prevalence of global acute malnutrition was 3.5%, severe acute malnutrition was 0.3% and stunting was 37.9%, which is higher than the 18.7% estimated for Nairobi province.
In 2012, Concern indicated that global acute malnutrition rates varied from 3-8% throughout the year, with the highest rates at the end of the hunger gap, and in Kisumu they tended to be higher than Nairobi, which may have been due to greater relative poverty and higher rates of HIV.

2009 data from Concern in Nairobi North and East slums reported that 40% of children 0-6 months were exclusively breastfed the previous day, and most children 6-23 months were receiving the minimum number of meals for their age (although nutrition surveillance data indicated that this rate is closer to 13%).

To address these issues, the Nairobi Urban Cash Transfer programme was designed in response to the government’s declaring of its food crisis as a national disaster in January 2009, but did not target urban vulnerable groups. Concern, with Oxfam GB, ran a project from October 2009 through February 2012 aimed at establishing a social protection program for the urban poor. An evaluation showed that economic outcomes and household food consumption and dietary diversity improved, but did not measure impact on child diet or nutritional status.

WASH Landscape

Access to improved water has actually decreased in urban areas in the last few years; it is down to 82% (2015) from 92% in 1990. Only 31% of the urban population have access to improved sanitation, a slight increase from 27% in 1990 (UNICEF/WHO, 2015). However, there are considerable differences among estimates from different sources. For example, a report from the Ministry of Devolution and Planning indicates that 70% of urban areas have access to improved sanitation (Ministry of Devolution and Planning, 2013). 48% of households in urban areas share a latrine with other households (UNICEF/WHO, 2015), but the practice of open defecation in urban areas is reported to be very low (1%) with only 3% of those who practice open defecation reporting it as a regular practice (PMA, 2016). As in Uganda and Tanzania, poor water, sanitation and sewerage accessibility is linked and attributed in part due to rapid urbanization.

1. Clean water is one of the most pressing issues facing urban residents, in Kenya as elsewhere. Some key findings on the topic are:

- A study of water sources in informal settlements in Kisumu City found that all unprotected wells and 92.6% of protected wells were positive for E. coli and that distance from pit latrines was “negatively associated with E. coli coliform density for wells” (Opisa, et al., 2012).
- Clean water access has deteriorated for households in urban slums in Kenya with a little over fifty percent having access to clean water in 2003, compared to 87 percent in the 1990s (Fotso, et al., 2007).
- A major factor in the decline is in household’s reliance on private street vendors, which were also reported to provide “unsafe water” (Fotso, et al., 2007).
- In a study of 674 poor and non-poor urban households in Nairobi, Mombasa, and Kakamega, the poor were found to pay slightly more than the non-poor for water and to spend 3 times as much time collecting water as non-poor households (Gulyani, Talukdar, & Kariuki, 2005).
- Water provision through kiosks does not serve the poor well in terms of water quality and the provision of subsidized water (Gulyani, et al., 2005).

2. There is also considerable literature on sanitation in urban Kenya. Some key findings include:
An evaluation of microwave treatment of fecal sludge from UDDT toilets in slums in Nairobi and found that the method was rapid and successful in destroying E. coli and Ascaris lumbricoides eggs and may provide a method for dealing with contaminated waste in toilets that quickly fill up in slum areas, as well as in emergency situations (Mawioo, et al., 2016).

A study of urine diversion dehydration toilets (UDDTs) in both rural and peri-urban areas of Kenya found that UDDT models were accepted by toilet owners, but not replicated. Their poor update was reportedly linked to insufficient “triggering” for behavior change, dependency on subsidies, reuse of compost deemed to not be a sufficient incentive for use and limited time for follow-up for the short project (Satrovoytova ,2012).

3. The relationship between WASH and disease is an important one. Although this review does not delve deeply into this relationship we do highlight some important findings:

- A study using video surveillance at four primary school handwashing facilities in urban Kenya over eight weeks documented higher hand washing rates (71%) when another student was there, rather than when a student was alone, and higher rates of handwashing with soap than use of sanitizer was captured by video compared to in-person observation. Sanitizer was preferred over soap by both students and teachers. (Pickering et al 2014).
- A similar study found that hand washing with sanitizer was higher than with soap (82% compared to 38%) (Pickering et al 2013).
- Reduction in rhinorrhea (runny nose) was higher among hand sanitizer uses, no other statistically significant differences were found in the reduction of diarrhea or respiratory illnesses (Pickering et al 2013).
- The availability of water, regardless of soap or hand sanitizer increased the rate of handwashing (Pickering et al 2013).

Preliminary Conclusions and Next Steps

Our preliminary analysis of the landscape surrounding nutrition, WASH, and child health in urban East Africa makes several points clear. Foremost, there is still little published literature on the intersections of nutrition, WASH, and child health in urban Uganda and urban Tanzania. While there is significantly more research on these topics in urban Kenya, much of the research is based on a single data source, the NUHDSS. The NUHDSS is a rich source of data on the topics of interest, and will continue to be an important resource for researchers as urbanization increases. Other than this data set, many of the studies included in this review are based on small sample sizes, making conclusions based on them more difficult to generalize. There is a growing body of qualitative literature of interest, but the lack of generalizability of findings about nutrition, WASH, and child health in urban areas make it difficult to assess the true state of urban child health in East Africa. The aim is to build off of this initial review to include other important documents that may not have been included here.

The East, Central, Southern Africa Health Community (ECSA-HC) and a steering committee comprised of Ifakara Health Institute, Infectious Disease Institute and Africa Academy of Public Health along with support from University of Research Co., LLC, through support from USAID, will hold a two-day consultation. The purpose is to consider existing evidence, gaps and opportunities that can inform an implementation science agenda to improve health of children in urban areas through nutrition and WASH interventions in East, Central and Southern Africa. Understanding the need for a multi-sectoral
approach to these issues, the regional consultation will bring together a range of stakeholders including: members of ministries of health, urban planning and related ministries, nutrition and WASH program implementers and researchers from Africa and other donors and global institutions.

The objectives are to (1) assess the context and determinants of urban health challenges and opportunities to advance nutrition and WASH interventions for the poorest children in urban settings; (2) review the relevant available evidence from Sub-Saharan Africa, (3) consider different stakeholder perspectives related to nutrition and WASH efforts that address children in urban settings, (4) propose a set of implementation science priorities to advance the health of children in urban areas through nutrition and WASH.

Desired meeting outputs and outcomes include:

1. A list of implementation science priorities—including framing for an initial “situational assessment or study;”
2. Identification and incorporation of evidence (both peer reviewed and grey) that belong in a more complete and synthesized version of the present Landscape Analysis;
3. Improved understanding of investments, activities, key actors and experts in this area who may serve on a technical advisory group or form part of a community of practice in the future.
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## APPENDICES

### Appendix 1: Mapping Nutrition Efforts

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<td>Action Against Hunger</td>
<td>Uganda</td>
<td>Connecting most vulnerable children with services to prevent and treat under-nutrition</td>
<td>World Food Program (WFP), Ministry of Health</td>
<td>Analyzes both indirect and direct factors and conducts rigorous assessments to determine prevalence and the root causes of undernutrition. Gathers, analyzes and shares data to inform effective and relevant response.</td>
</tr>
<tr>
<td></td>
<td>Kenya</td>
<td>Targeting severely malnourished children under 5</td>
<td>WFP, Supplemental Nutrition Assistance Program (SNAP)</td>
<td>Provides nourishing meals and creates long term solutions for clean water, medical care and education</td>
</tr>
<tr>
<td></td>
<td>Uganda</td>
<td>Eliminating malnutrition</td>
<td>Google, Conscious Step</td>
<td>Works through local partner organizations to ensure children have what they need to achieve their potential at every age</td>
</tr>
<tr>
<td></td>
<td>Kenya</td>
<td>Provision of meals at school-based feeding centers</td>
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<td></td>
<td>Tanzania</td>
<td>School feeding program</td>
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<tr>
<td>FHI 360</td>
<td>Uganda</td>
<td>Food and Nutrition Technical Assistance III</td>
<td>USAID</td>
<td>FHI 360 partners with countries, international organizations, and funders to design strategies, policies, programs, and systems that address nutrition emergencies and create sustainable change</td>
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<tr>
<td></td>
<td>Kenya</td>
<td>Nutrition and Health Program Plus</td>
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<td></td>
<td>Tanzania</td>
<td>Food and Nutrition Technical Assistance III</td>
<td></td>
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<tr>
<td>Food for the Hungry</td>
<td>Uganda</td>
<td>Teaching farmers best agricultural practices</td>
<td>Australian Development Agency</td>
<td>Food for the Hungry seeks to end ALL forms of human poverty by going to the hard places and walking with the most vulnerable people</td>
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<td></td>
<td>Kenya</td>
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<tr>
<td>Save the Children</td>
<td>Uganda</td>
<td>Vital nourishment and feeding vulnerable children</td>
<td>P&amp;G, C&amp;A, Google, Disney, Western Union</td>
<td>Ensures sustained access to life-saving maternal, newborn, and child health and nutrition services.</td>
</tr>
<tr>
<td>International</td>
<td>Kenya</td>
<td>Mitigating the effects of drought</td>
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<td></td>
<td>Tanzania</td>
<td>Advocating for a national nutrition policy</td>
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<tr>
<td>Scaling up Nutrition</td>
<td>Uganda</td>
<td>Training in nutrition advocacy</td>
<td>World Bank, The Global Agriculture</td>
<td>SUN uses an approach that presents the experiences of SUN Countries</td>
</tr>
<tr>
<td>Country</td>
<td>Program Description</td>
<td>Supporting Agencies</td>
<td>Description</td>
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<tr>
<td>Kenya</td>
<td>Food fortification program and Food Security Program</td>
<td></td>
<td>and other national stakeholders as they scale up efforts to ensure all people enjoy good nutrition</td>
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</tr>
<tr>
<td>Tanzania</td>
<td>Programs for improved nutrition</td>
<td></td>
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<tr>
<td><strong>Strengthening Partnerships Results and Innovations in Nutrition Globally (SPRING)</strong></td>
<td>Uganda: Activities that contribute to the reduction of stunting and anemia</td>
<td>SPRING/Uganda: SPRING/Uganda directly supports and implements activities and policies related to large-scale food fortification to address stunting and micronutrient deficiencies and anemia reduction through multi-sectoral coordination</td>
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<td></td>
<td>Kenya: Ongoing drought relief</td>
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<tr>
<td>UNICEF</td>
<td>Uganda: Applying Science to Strengthen and Improve Systems (ASSIST)</td>
<td>USAID</td>
<td>Implements a comprehensive and client-centered approach called nutrition assessment, counseling and support (NACS) for adults and children</td>
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<tr>
<td></td>
<td>Uganda: Food security projects</td>
<td>USAID, UKAID, EU</td>
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<td></td>
<td>Tanzania: Ongoing drought relief</td>
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<tr>
<td>University Research Co.</td>
<td>Uganda: Applying Science to Strengthen and Improve Systems (ASSIST)</td>
<td>USAID</td>
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<td></td>
<td>Kenya: Ongoing drought relief</td>
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</table>
## Appendix 2: Mapping WASH Efforts

<table>
<thead>
<tr>
<th>Implementing Organization</th>
<th>Countries</th>
<th>Current Projects</th>
<th>Funders</th>
<th>Approaches</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Child’s Hope International</td>
<td>Kenya</td>
<td>Provision of clean water to vulnerable children</td>
<td>USAID, WHO</td>
<td>The program provides clean drinking water to the people who need it most using water purification packets invented by P&amp;G</td>
</tr>
<tr>
<td>Action Against Hunger</td>
<td>Uganda</td>
<td></td>
<td>Google, P&amp;G, Research for GOOD</td>
<td>Teams distribute hygiene kits and build latrines and hand-washing stations</td>
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<tr>
<td>ACTogether Uganda</td>
<td>Uganda</td>
<td>Slum upgrading and sanitation in Kampala and other urban areas</td>
<td>Slum Dwellers International Network, Cities Alliance</td>
<td>ACTogether and the NSDFU have constructed sanitation units throughout Kampala and 5 other municipalities. Several of these units have incorporated second-floor community halls</td>
</tr>
<tr>
<td>Africare</td>
<td>Uganda</td>
<td>Hand washing campaign</td>
<td>USAID</td>
<td>Approach used is training of community members in hand washing with soap and other hygiene messaging</td>
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<td></td>
<td>Kenya</td>
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<td>Tanzania</td>
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<tr>
<td>Catholic Relief Services</td>
<td>Uganda</td>
<td>East Africa WASH programs</td>
<td>USAID, CDC, WHO, WFP</td>
<td>CRS uses a holistic approach called integral human development to help people reach their full potential, the dynamic process facilitates collaboration across civil society and the public and private sectors, to promote such transformative and sustainable change we engage people at every level.</td>
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<td></td>
<td>Kenya</td>
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<td>Tanzania</td>
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<tr>
<td>Child Fund International</td>
<td>Uganda</td>
<td>Provision of safe water</td>
<td>Google, Conscious Step</td>
<td>Work through local partner organizations to ensure children have what they need to achieve their potential at every age</td>
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<td></td>
<td>Kenya</td>
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<td></td>
<td>Tanzania</td>
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<tr>
<td>Kampala Capital City Authority</td>
<td>Uganda</td>
<td>Improving fecal sludge management in vulnerable poor areas of Kampala</td>
<td>Bill and Melinda Gates Foundation</td>
<td>Engages local leaders at all levels, sensitize communities using door to door sanitation visits.</td>
</tr>
<tr>
<td>P&amp;G Children’s Safe Water</td>
<td>Uganda</td>
<td>Provision of safe water in East Africa</td>
<td>USAID, WHO</td>
<td>The program provides clean drinking water to the people who need it most using water purification packets invented by P&amp;G</td>
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<td></td>
<td>Kenya</td>
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<tr>
<td>Plan International</td>
<td>Uganda</td>
<td>Community-led total sanitation</td>
<td>Conrad N. Hilton Foundation</td>
<td>Community led total sanitation uses a community wide change</td>
</tr>
<tr>
<td>Country</td>
<td>Organization</td>
<td>Activity</td>
<td>Description</td>
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<tr>
<td>Kenya</td>
<td>Community-led action for children— Nairobi-Mathare informal settlement</td>
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<td>approach that mobilizes communities to undertake their own appraisal analysis and sanitation issues</td>
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<tr>
<td>Tanzania</td>
<td>PSI</td>
<td>Uganda Safe water</td>
<td>USAID, The German Development Bank</td>
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<tr>
<td></td>
<td></td>
<td>Kenya Safe water to schools</td>
<td>PSI uses social marketing and social franchising for WASH programs to encourage healthy behaviors and strengthen supply chains, to improve the capacity of providers to deliver affordable, equitable and quality services to the poor. Leverages the expertise and resources of the public and private sectors to maximize health impact in WASH programming through engagement with actors at multiple levels</td>
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<td></td>
<td></td>
<td>Tanzania Water-borne disease prevention campaign</td>
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<tr>
<td>Safe Water and AIDS Project</td>
<td>Kenya</td>
<td>Door to door promotion of health and hygiene</td>
<td>P&amp;G</td>
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<td>SNV</td>
<td>Uganda Sustainable sanitation and hygiene for all (SSHH4A)</td>
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<td>Kenya</td>
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<td>Tanzania</td>
<td>(SSHH4A)</td>
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<tr>
<td>UNICEF</td>
<td>Uganda U-report</td>
<td></td>
<td>UKAID</td>
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<td>Kenya</td>
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<tr>
<td>Urban Poor Fund International</td>
<td>Uganda</td>
<td>Construction of sanitation infrastructure in Biashara and Kianidutu settlements in Nairobi</td>
<td>Bill and Melinda Gates Foundation, Muungano Support Trust, Akiba Mashinani Trust The Kianidutu Sanitation Project used a community led approach initiated by savings schemes in Kianidutu slum also referred to as the Kianidutu Muungano Network. Muungano wa Wanavijiji in collaboration with the Kianidutu community carried out an enumeration and mapping process in 2012, which revealed that the sanitation conditions in the settlement were very poor. The enumeration showed that approximately forty-two (42) individuals use one toilet in the settlement yet the recommended standards are one (1) toilet for every twenty (20) individuals.</td>
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<td>WASH Plus</td>
<td>Uganda</td>
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<td>USAID</td>
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<tr>
<td>Country</td>
<td>Location</td>
<td>Organization and Programs</td>
<td>Partners and Collaborators</td>
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<tr>
<td>Kenya</td>
<td>Schools for water; Water action group; Nairobi water roundtable</td>
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<tr>
<td>Tanzania</td>
<td>Community participation in the management and conservation of water resources; Community water provision; Fair water futures</td>
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<tr>
<td>Water for All</td>
<td>Uganda</td>
<td>Donating water solutions</td>
<td>Barclays, Unilever, USAID</td>
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<tr>
<td>Kenya</td>
<td></td>
<td>Fund projects that give people in need access to clean drinking water, sanitation and hygiene, the actual projects are carried out by partnering NGOs with expertise in water and with local staff in the project country.</td>
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<td>Tanzania</td>
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<td>Water.org</td>
<td>Uganda</td>
<td>Provision of safe water; Water credit loans project</td>
<td>Pepsico Foundation, Helmsley Charitable Trust</td>
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<td>Kenya</td>
<td></td>
<td>Focus on empowerment through access to credit loans to be able to provide safe water and sanitation</td>
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<td>Tanzania</td>
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<td>Water4</td>
<td>Uganda</td>
<td>mWASH</td>
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<tr>
<td>Kenya</td>
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<tr>
<td>Wateraid International</td>
<td>Uganda</td>
<td>Provision of clean water, sanitation, hygiene</td>
<td>Water Programme, HSBC Foundation, H&amp;M Foundation</td>
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<tr>
<td>Kenya</td>
<td></td>
<td>To transform lives, they deliver taps and toilets, campaign for change and build the skills of local people</td>
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<td>Tanzania</td>
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<tr>
<td>World Vision</td>
<td>Uganda</td>
<td>WASH programs</td>
<td>USAID</td>
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<td>Kenya</td>
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<td>Tanzania</td>
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