WASH in Wetlands
Where do we stand?

Carmen Anthonj
Andrea Rechenburg
Thomas Kistemann

Institute for Hygiene and Public Health, GeoHealth Centre, University of Bonn
WHO Collaborating Centre for Health Promoting Water Management
The meaning of wetlands

Wetlands include a wide variety of habitats such as marshes, peatlands, floodplains, rivers and lakes, coastal areas, marine areas no deeper than six metres at low tide, as well as human-made wetlands such as waste-water treatment ponds and reservoirs (Ramsar 1971)

Provision of ecosystem services vital to human health and well-being and survival.
GlobE Wetlands in East Africa - *reconciling future food production with environment protection*

- Multilateral multidisciplinary research - Uganda, Rwanda, Tanzania, Kenya
- Work package on Human Health Impact (MEA 2005, WHO & Ramsar 2012)

- Deliver an understanding about public health aspects associated with wetlands
- A holistic Health Impact Assessment, which will be used to guide policies
Why address WASH in wetlands?

- Sources of water and nutrition, livelihoods, extensive and increasing use
- Poor waste management & sewerage infrastructure & limited water resources
- Ideal habitats of disease-causing microorganisms and invertebrates threatening health
- Safe WASH as crucial precondition for the prevention of disease transmission
- Research on wetland-specific WASH aspects is lacking
’The swamp is the only source of water that we have’
(Pastoralist in Mathera, Ewaso Narok Swamp)
Where to assess WASH in wetlands?
The study area: Ewaso Narok Swamp, Kenya

Legend
- Ewaso Narok Swamp (estimated)
- River
- Study villages
- Administrative centre
- Border of location
- Road

Cartography:
GeoHealth Centre, IHPH Bonn, 2016

Data Sources:
Open Streetmap, GADM, own data, data from Beuel et al. (2016) and Leemhuis et al. (2016)
How to assess WASH in the Ewaso Narok Swamp?

**DATA COLLECTION**

**Target group**
- wetland population & users
- 4 different groups (n~100/group)

**Mixed Methods**
- Cross-sectional household survey (n=400)
- Observational WASH assessment (n=397)
- Qualitative in-depth interviews (n=20)

**DATA ANALYSIS**

**Calculate scores on water storage, sanitation & hygiene condition**

**Detect differences between groups in terms of WASH**

**Explain WASH situation & behaviour**

**Significance and correlations**
- Kruskal-Wallis H test

**Associate quantitative data with qualitative quotes & explanations**

IHPh – Institute for Hygiene and Public Health
GeoHealth Centre
## Characteristics of different user groups

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Smallholder farmers (n=106)</th>
<th>Commercial farmers (n=95)</th>
<th>Pastoralists (n=99)</th>
<th>Service sector (n=100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household head (male/female) [%]</td>
<td>29/71</td>
<td>31/69</td>
<td>49/51</td>
<td>80/20</td>
</tr>
<tr>
<td>School education [years]</td>
<td>4</td>
<td>7</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>Never attended school [%]</td>
<td>36.8</td>
<td>14.7</td>
<td>63.3</td>
<td>6</td>
</tr>
<tr>
<td>Household size (mean)</td>
<td>5</td>
<td>5</td>
<td>6.5</td>
<td>4</td>
</tr>
<tr>
<td>Number of children in household (mean)</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>1.3</td>
</tr>
<tr>
<td>Distance of household to wetland (mean) [km]</td>
<td>2.5</td>
<td>1.5</td>
<td>4.5</td>
<td>14</td>
</tr>
<tr>
<td>Relative socio-economic status (mean)</td>
<td>medium</td>
<td>medium</td>
<td>low</td>
<td>high</td>
</tr>
<tr>
<td>Improved water source [%]</td>
<td>50</td>
<td>27</td>
<td>6</td>
<td>78</td>
</tr>
<tr>
<td>Applying health-protective measures [%]</td>
<td>84.9</td>
<td>89.5</td>
<td>61.0</td>
<td>94</td>
</tr>
<tr>
<td>Exposure to health risks in wetlands (perception) [%]</td>
<td>74.5</td>
<td>54.7</td>
<td>56.6</td>
<td>55</td>
</tr>
</tbody>
</table>

IHHP – Institute for Hygiene and Public Health
GeoHealth Centre
## Characteristics of different user groups

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Smallholder farmers (n=106)</th>
<th>Commercial farmers (n=95)</th>
<th>Pastoralists (n=99)</th>
<th>Service sector (n=100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved water source [%]</td>
<td>50</td>
<td>27</td>
<td>6</td>
<td>78</td>
</tr>
</tbody>
</table>

40% in the wetland versus 57% rural areas in Kenya according to JMP (2015)
Characteristics of different user groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Number (n)</th>
<th>Male (%)</th>
<th>Female (%)</th>
<th>School Education (years)</th>
<th>Never Attended School (%)</th>
<th>Household Size (mean)</th>
<th>Number of Children (mean)</th>
<th>Distance to Wetland (mean km)</th>
<th>Relative Socio-Economic Status</th>
<th>Improved Water Source (%)</th>
<th>Applying Health Protective Measures (%)</th>
<th>Exposure to Health Risks in Wetlands (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smallholder Farmers</td>
<td>105</td>
<td>29/71</td>
<td></td>
<td>4</td>
<td>36.8</td>
<td>5</td>
<td>2</td>
<td>2.5</td>
<td>Medium</td>
<td>50</td>
<td>84.9</td>
<td>74.5</td>
</tr>
<tr>
<td>Commercial Farmers</td>
<td>92</td>
<td>31/69</td>
<td></td>
<td>7</td>
<td>14.7</td>
<td>5</td>
<td>2</td>
<td>1.5</td>
<td>Medium</td>
<td>27</td>
<td>89.5</td>
<td>54.7</td>
</tr>
<tr>
<td>Pastoralists</td>
<td>91</td>
<td></td>
<td>49/51</td>
<td>2</td>
<td>63.3</td>
<td>6.5</td>
<td>3</td>
<td>4.5</td>
<td>Low</td>
<td>6</td>
<td>61.0</td>
<td>56.6</td>
</tr>
<tr>
<td>People in Service Sector</td>
<td>88</td>
<td></td>
<td></td>
<td>10</td>
<td>6</td>
<td>4</td>
<td>1.3</td>
<td>14</td>
<td>High</td>
<td>78</td>
<td>94</td>
<td>55</td>
</tr>
<tr>
<td>Total</td>
<td>376</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

40% in the wetland versus 57% rural areas in Kenya according to JMP (2015)
WASH conditions in the Ewaso Narok Swamp

In general, domestic water supply, water storage, sanitation and hygiene are inadequate in the Ewaso Narok Swamp.

The water storage, sanitation and hygiene scores were significantly associated.

<table>
<thead>
<tr>
<th></th>
<th>Service sector (n=100)</th>
<th>Pastoralists (n=104)</th>
<th>Commercial farmers (n=92)</th>
<th>Smallholder farmers (n=99)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Water</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>negative (-1)</td>
<td>neutral (0)</td>
<td>positive (+1)</td>
<td></td>
</tr>
<tr>
<td><strong>Sanitation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>negative (-1)</td>
<td>neutral (0)</td>
<td>positive (+1)</td>
<td></td>
</tr>
<tr>
<td><strong>Hygiene</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>negative (-1)</td>
<td>neutral (0)</td>
<td>positive (+1)</td>
<td></td>
</tr>
</tbody>
</table>
WASH conditions in the Ewaso Narok Swamp

- The WASH situations significantly differ between the different wetland user groups
- Out of all groups, the people in the service sector had the best WASH situation, while the pastoralists had the worst.
The wetland water causes diseases. If someone drinks the dirty water, they can be sick. Animals are in the water, people dump their waste into the water, people use the water as latrine to relieve themselves and that is the same water that we use in the house. When it rains, dirt is washed into the river. It is the same water we use.
(Pastoralist in Nklois, Ewaso Narok Swamp)
Perceptions of WASH in the Ewaso Narok Swamp

Perceived reasons and explanations of unsafe water, inadequate sanitation and poor personal hygiene include the water source and quantity, the physical environment, lifestyle, traditions and habitual behaviour, education and health knowledge and health risk perception.
Association of WASH condition with qualitative data on health risk perception

Eye diseases are also caused by dirty water. Even when you are stepping over dirty water you can get diseases (co2).

The wetland water causes diseases. If someone drinks the dirty water, they can be sick. Animals are in the water, people dump their waste in the water, people use the water as latrine to relive themselves and that is the same water they use in the house. When it rains, dirt is washed to the river. It’s the same water we use (pa5).

Intestinal worms are common and cause diarrhoea. And there is cholera, it comes from drinking dirty water from the river. When it rains, the people fetch the dirty water and use it (sh3).

Diarrhoea is also common, because they don’t have toilets and there are intestinal worms (se2). When people have only low quality of water available for washing their skin, they get skin diseases (se5).
WASH in wetlands – where we stand:

- Communities in the wetland have by far less improved water sources and sanitation facilities than nationwide average (JMP) → national & international relevance

- Inhabitants understand situation and risks related to WASH, but lack access → need for structural improvements to close the WASH gap

- Critical importance to study WASH in special settings such as wetlands and among different population subgroups to reach the unserved → observational tool

- Need for an integrative approach complementing wetland management by public health and WASH interventions and education
Thank you very much for your attention


Research funded by the
Federal Ministry of Education and Research
(grant number FKZ 031A250D)