Mike Aiello
1954-2022
2nd Partners Summit (2013)
3rd Partners Summit (2014)
4th Partners Summit (2015)
5th Partners Summit (2016)
6th Partners Summit (2017)
7th Partners Summit (2018)
9th Partners Summit (2020)
Partners Summit™

2022 WATER BUILDS
Kenya 23 Revisited: Water Builds Change
Grundfos and “The Kenya 23”

A Story of Commitment and Perseverance in Bringing Water to People in Need

• 2005: 60th Jubilee Celebration
  – 25 Solar water pumping systems donated
  – Schools in Kenya
60th Jubilee Celebration

- Solar water pumping systems
  - Design
    - Grundfos
  - Implementation
    - In-country distributor
Solar Panels
Elevated Water Tank
Well
20-Konyao
• 2005: 60th Jubilee Celebration
  – 25 Solar water pumping systems donated
  – Schools in Kenya
• 2007: Water Mission and Grundfos partnership begins
• 2009: Kenya projects mentioned
  – 25 Projects: Two never materialized, funds vanished
  – 23 Implemented projects
  – Within one year of implementation, eight are functional
• 2014: Grundfos partners with Water Mission to assess the 23 projects
Grundfos – Kenya 23

July 2014: Assessments begin

1-Emachini Community
“Kenya23” Project Characteristics

- 16 hours from Kitale (far Turkana area and Mombasa)
- 4 hours from Lodwar, the pavement ends (12-hour drive on dirt road)
- 7 locations with almost no cell phone coverage
- 15 projects were functioning in some capacity (using bubble gum, duct tape, and bicycle tubing)
  - 12 as the original set up, 7 to 11 years old
  - 3 were modified (1 AC, 1 Genset, 1 Solar Inverter)
- 8 projects were not functioning at time of visit
- Almost all projects reported pump failure within 2 years of installation
- Approximately 19 of the original 23 projects managed to replace their pump by raising funds—this was a big challenge for them
- 12 projects had seen intervention by other NGOs
- 13 community / 10 school managed
Why were there problems?

- Locations
  - Remote and spread out
- Design
  - Robust but only access was at the borehole, which could be remote
- Implementation
  - Contractor issues
    - Money disappearing
    - Quality of work
    - Warranties not honored (or mentioned)
  - Training
    - Limited operational
    - No maintenance
    - No management
    - No community engagement
  - No follow-up or ongoing support
Solutions are designed in accordance with engineering standards while also accounting for unique cultural context and supply chain limitations. Reliable project management is required to ensure the system is constructed and operated in accordance with the design. The people processes and systems necessary to operate and maintain equipment and to manage ongoing education and finances must be planned and cultivated with local stakeholders.
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Reliable project management is required to ensure the system is constructed and operated in accordance with the design.

The people processes and systems necessary to operate and maintain equipment and to manage ongoing education and finances must be planned and cultivated with local stakeholders.
WATER MISSION’S THEORY OF CHANGE

Community Managed
Plus WASH Projects

Interpret from the bottom up
03 St. Cecilia’s

“Kenya23” Project Characteristics

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- 4 hours from Lodwar, the pavement ends (12-hour drive on dirt road)
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- 12 projects have seen intervention by other NGOs
- 13 community / 10 school managed
3-St. Cecilia’s Girls School
Assessment Report

1. Community Survey
   1. General Information
      - Community Name: St. Cecilia’s Girls School
      - Project No.: 80032
      - Date: 07/16/14
   2. Contact Information
      - Name: Sally
      - Position: Principal
      - Email: Sally@email.com
      - Phone: 555-1234
      - Fax: 555-4321

2. Local Government Authority
   - Name: Lisa
   - Title: Area Chief
   - Email: Lisa@email.com
   - Phone: 555-5678

3. Water, Sanitation and Hygiene Status
   - Community Mapping Exercise:
     a. Mark community leaders on a site map of the intended service area and indicate significant geographical features (e.g., roads, bodies of water, elevation differences, ravines, swamps, etc.).
     b. Indicate the locations of all water sources and supply systems on the map (e.g., municipal water supply distribution points, boreholes, shallow wells, springs, lakes, rivers, rainwater harvesting systems, etc.).
     c. Indicate the flow rates for water systems on the map.
     d. Indicate the number of sanitation facilities on the map (e.g., public latrines, household latrines, etc.).
     e. Indicate the locations of all sanitation facilities on the map.
     f. Indicate the location of the water supply and sanitation equipment on the map (if applicable).
   - Contact community leaders in order to complete the water source and sanitation facility identification on the map.

   1. Which of the identified water sources/supply systems do households use in the community?
      - Well
      - River
      - Spring
      - Other: Rainwater harvesting system
   2. Do any households treat water before drinking?
      - Yes
      - No
   3. How much water do households in the community collect and use each day (from any source/supply system)?
      - At least: 500 liters/2,000 gallons
      - At most: 250 liters/1,000 gallons
   4. Is treated and bottled water (e.g., water sold in bottles) sold in the community?
      - Yes
      - No
   5. Typical Price of Safe Water (in local currency) per unit (liter):
      - 100 lites/4,000 gal: $5
      - 50 lites/2,000 gal: $2
   6. Contact Information for Individuals and/or Companies Selling or Purchasing Bottled Water
      - Supply Water Users Association: Provide piped water users in NERES for community and 200 LITERS users for institutions.

Completed by: [Signature] Date: 07/16/14
Rev: 07/16/14
<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Water Sanitation and Hygiene Status (continued)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. If known, briefly describe the original source of this safe water</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Is wastewater (in containers/bags or from kitchen/sinks) sold in the</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>community?</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>9. Typical Price of Unsafe Water:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Contact Information for Individuals and/or Companies Selling or</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purchasing and Reselling Unsafe Water:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Describe and condition of existing water supply infrastructure</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>(treatment equipment, tanks, piping, pumps, etc.)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Describe and condition of existing sanitation facilities</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>(public/private toilets, piped coverage, latrines, etc.)</td>
<td></td>
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<tr>
<td>13. Estimate percentage of population currently using the sanitation</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>options (check all that apply)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>14. Describe any local or government plans that are in place to</td>
<td></td>
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<tr>
<td>improve or expand the existing water sources, water supply</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>infrastructure, and sanitation facilities in the foreseeable future:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Are industries present that could affect the quality of any of the</td>
<td></td>
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<tr>
<td>water sources in the area?</td>
<td></td>
<td></td>
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<tr>
<td>16. Which waterborne or water-related diseases are prevalent in the</td>
<td></td>
<td></td>
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<tr>
<td>community (check all that apply):</td>
<td></td>
<td></td>
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<tr>
<td>17. Does the community attribute the presence of illness to inadequate</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>water supply and sanitation facilities?</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>18. Are any additional measures or controls being imposed?</td>
<td></td>
<td></td>
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<tr>
<td>19. Water Quality of physical, chemical, aesthetic</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>20. Water Access (reliability, quantity, affordability, affordability)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>21. Did you accept household connection at commissioning?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22. Did you make repairs or maintenance to existing water sources?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23. Did you make repairs or maintenance to existing sanitation facilities</td>
<td></td>
<td></td>
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<tr>
<td>24. Briefly describe the community’s reaction to the promotion/education</td>
<td></td>
<td></td>
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<tr>
<td>and any impact it may have had.</td>
<td></td>
<td></td>
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<tr>
<td>25. What (if any) existing social and cultural norms and motivators</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>might influence public adoption of healthy water consumption and</td>
<td></td>
<td></td>
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<tr>
<td>hygiene behavior (e.g., perception of chlorine taste, knowledge of</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>transmission pathways, etc.)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Organizational Capacity**

1. Which groups are involved in making general decisions and changes in the community? (check all that apply, obtain contact information for all local influential individuals that are identified):
   - Formal National Government
   - Formal Local Government
   - Elders
   - Heads of Household
   - Indigenous Representatives (healthcare, religious, school, etc.)
   - Process
   - Other

2. Do households/units typically remain in the community for more than one year? Yes / No

4. Is the community willing and capable of organizing a Safe Water Committee according to recommendations? Yes / No

5. Briefly describe the work (including any related to water, sanitation and hygiene) the non-governmental organizations or other community-based organizations have done or are currently doing in the community:

   **World Vision champions**

   - [Add description here]

6. If other organizations are working in the community, identify and list key individuals associated with them:

   - Name / Organization / Contact Information:
     - [Add information here]

7. Briefly describe the impact that this work has had in the community:

   - [Add description here]

8. Was the outcome of this work sustainable? Yes / No

5. Equity and Contributions:

1. Briefly describe the main sources of income for households in the community:

   **Earnings**

   - [Add description here]

   **Household income**

   - (estimate average income and expenditure made by households in the following categories)
     - All households: $6000 (USD - local currency) / 200 (USD - local currency) per month / year
     - Formal National Government: $3000 (USD - local currency) / 100 (USD - local currency) per month / year
     - Elders: $2000 (USD - local currency) / 60 (USD - local currency) per month / year

   **Food**

   - (estimates household spending for all members)
     - $900 (USD - local currency) / 30 (USD - local currency) per month / year

   **Healthcare** (including hospital or clinic visits)

   - (estimates cost of healthcare)
     - $800 (USD - local currency) / 20 (USD - local currency) per month / year

   **Mobile phone**

   - (estimates cost of mobile phone)
     - $700 (USD - local currency) / 20 (USD - local currency) per month / year

   **Name and contact information of local sources who will meet the needs of the community**

   - [Add information here]
5. Equity and Contributions (continued)

<table>
<thead>
<tr>
<th>10. Are skilled persons available in the community?</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. Which op-level aspects of the project are the community able to pay for or contribute? (check all that apply)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Briefly describe how the community will gather the materials and/or funds in order to make these contributions:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initiatives/Community Mobilization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Which ongoing aspects of the project are the community willing to pay for or contribute? (check all that apply)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. How will the Safe Water Project's operational and replacement expenses be met?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Will the Safe Water Committee be able to open and maintain a bank account in order to save project funds?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>16. How far away is the nearest water?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Is there a mobile money service in the community?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>18. Service Provider(s):</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6. Worldview and Religious Orientation

<table>
<thead>
<tr>
<th>1. Prevalent religious systems (check all that apply):</th>
<th>Protestant Christianity</th>
<th>Catholicism</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Which of these belief systems is the most prominent?</td>
<td>Catholicism</td>
<td></td>
</tr>
<tr>
<td>3. Estimated percentage of community active participating in predominant belief system:</td>
<td>50%</td>
<td></td>
</tr>
</tbody>
</table>

7. Testimonials

Find two to four long-term residents of the community who are able to answer the following questions. Each individual must respond positively to the consent statement. Each individual may respond to one or more of the questions. Record the responses with an audio recorder and transcribe the most meaningful responses below. The time to interview the individuals that the Safe Water Project may not be implemented in their community because it has not yet been approved by Water Missions International. Take two photographs of each individual (our front photograph and one full-body photograph that shows surroundings) and record his or her name, livelihood and/or position in the community, and household characteristics.

Consent statement: Do you agree to let Water Missions International use your response(s) and photograph in marketing and promotional materials, both in print and on the internet, to solicit funding from donors groups for future work from which you may or may not benefit directly without financial compensation of any kind?

1. Please describe the steps that you and members of your family take to meet your daily water, hygiene and/or sanitation needs:
   - Which family member(s) usually take(s) these steps?
   - What water source/measurement facility is used and where is it located?
   - How is the water collected, treated and stored? (water steps only)
   - When and how often are these steps taken?

2. How much time does this take? | 3 hours |

3. Insert Address Photograph Below

4. Insert Full-Body Photograph Below

5. Insert Audio Recording Below

6. Completed By: [Name] | Date: [Date] | Rev: [Revision]

7. Water Missions International
3-St. Cecilia’s Girls School

7. Testimonials (continued)

2. How do the steps that you and members of your family take to meet your daily water, hygiene and sanitation needs affect you and your family in the following ways?

a. Social relationships:
   - Respondent wishes to remain anonymous (do not use photograph)

b. Economic well-being:
   - Respondent wishes to remain anonymous (do not use photograph)

c. Physical health:
   - Respondent wishes to remain anonymous (do not use photograph)

d. Education:
   - Respondent wishes to remain anonymous (do not use photograph)

3. How would you and members of your family be affected in the following areas if an alternative, affordable source of safe water were available?

a. Social relationships:
   - We would have less conflict because everyone would have access to water.
   - Respondent wishes to remain anonymous (do not use photograph)

b. Economic well-being:
   - We would no longer have to ration water.
   - Respondent wishes to remain anonymous (do not use photograph)

c. Physical health:
   - We would have access to clean water.
   - Respondent wishes to remain anonymous (do not use photograph)

d. Education:
   - We would have more time to study.
   - Respondent wishes to remain anonymous (do not use photograph)

4. Measurement Model Recommendations:

3. Is the community satisfied with the current water supply?
   - Yes
   - No

4. Is the community willing to pay for the project?
   - Yes
   - No

5. Does the community have a plan to maintain the water supply?
   - Yes
   - No

6. Are there any obstacles to the project?
   - Yes
   - No

7. Are there any business practices in the community?
   - Yes
   - No

Additional Community Observations or Recommendations:

The school will take charge of managing the project. Their major concern is the high cost of electricity bills. They plan to install a solar-powered pump to minimize electricity costs. However, they are looking for a partner to help with the installation cost. The school has partnered with the local government and other organizations to ensure the project's success. They are committed to maintaining the system and ensuring sustainable access to clean water for the community.
II. Technical Survey

9. Seasonal Patterns

<table>
<thead>
<tr>
<th>Season</th>
<th>Rainy Season</th>
<th>Dry Season</th>
</tr>
</thead>
<tbody>
<tr>
<td>Months of the Year</td>
<td>April - October</td>
<td>November - March</td>
</tr>
<tr>
<td>2 Hours of Sunlight per Day</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>Average Rainfall (cm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average Temperature (°C)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

10. Electricity and Mobile Phone Service

<table>
<thead>
<tr>
<th>Type</th>
<th>Availability</th>
<th>Reliability</th>
<th>Unit Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Electrical Power Grid</td>
<td>Yes</td>
<td>Good</td>
<td>USD Local Currency per kWh</td>
</tr>
<tr>
<td>2 Gasoline</td>
<td>Yes</td>
<td>Good</td>
<td>USD Local Currency per LPG</td>
</tr>
<tr>
<td>3 Diesel Fuel</td>
<td>Yes</td>
<td>Good</td>
<td>USD Local Currency per LPG</td>
</tr>
</tbody>
</table>

4 Is reliable mobile phone service available in the community? Yes [ ] No [x]

6 If "yes", which mobile phone service providers operate in the area? [ ]

7 Briefly describe how people in the community charge their mobile phones:

Electricity: Power Cost at the rate...

8 How much money, on average, do people in the community spend to charge their mobile phones? [ ] USD Local Currency per charge...

11. Site Map

a. Include the site map of the intended service area and indicate significant geographical features (e.g. roads, bodies of water, elevation differences, rivers, streams, etc.) developed in section 3. Water, Sanitation and Hygiene Status

b. Indicate the locations of all water sources and sanitation facilities on the map (e.g. municipal supply distribution points, boreholes, shallow wells, springs, lakes, rivers, rainwater collection, etc.)

c. Indicate local names for water sources and sanitation facilities on the map

d. Indicate the locations of all sanitation facilities on the map (e.g. public latrines, household latrines, etc.)

e. Indicate the locations of all water sources and sanitation facilities on the map

f. Indicate relative distances between water sources and sanitation facilities on the map

g. Complete section 11. Index of Water Sources and Sanitation Facilities for each identified water source and sanitation facility

h. Collect water samples and complete a separate copy of Annex 2. Water Quality Report for each water source identified on the map

i. Complete a separate copy of Annex 3. Water Source and Water Supply – Technical Information for each water source identified on the map
### Water Missions International

#### 3-St. Cecilia’s Girls School

<table>
<thead>
<tr>
<th>Source/Supply/Facility Name</th>
<th>Site ID</th>
<th>Latitude</th>
<th>Longitude</th>
<th>Elevation</th>
<th>Notes*</th>
</tr>
</thead>
<tbody>
<tr>
<td>St. Cecilia's Secondary School BIS</td>
<td>N 01.29752</td>
<td>E 083.19483</td>
<td>117.1msl</td>
<td>Good conditions</td>
<td>2.0</td>
</tr>
<tr>
<td>Mercy center near school wall</td>
<td>N 01.20894</td>
<td>E 083.19764</td>
<td>176.5msl</td>
<td>Acidic BIS (8.2) wet</td>
<td>2.0</td>
</tr>
</tbody>
</table>

*Indicate which water source is being proposed for the Safe Water Project in the “Notes” section.

1. Indicate if any of the identified water sources or supplies are potential sources for the Safe Water Project:
   - [x] At least one water source or supply is a potential source for the Safe Water Project.
   - [ ] No water source is available for the Safe Water Project, but one can be developed.
   - [ ] No water source is available for the Safe Water Project, and there is no plan to develop one.

#### Additional Technical Observations or Recommendations:

- Total man-days spent by WMI community development staff during on-site assessment: 3
- Total man-days spent by WMI technical staff during on-site assessment: 1

Task status: [x] Complete  [ ] Skipped  [ ] Not applicable

---

#### Amenities 1.

**Water Source, Water Supply and Sanitation Facility – Social Information**

<table>
<thead>
<tr>
<th>Community Name</th>
<th>1. St. Cecilia Chaparral</th>
<th>2. Project Name</th>
<th>3. Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site ID:</td>
<td>Celebrate BIS</td>
<td>09-28-12</td>
<td>05-16-14</td>
</tr>
</tbody>
</table>

- Name of Water Source/Water Supply/Sanitation Facility: Celebrate BIS
- Project Name: Celebrate BIS
- Date: 05-16-14

- Completes a separate copy for each water source, supply, and sanitation facility identified in 11. Site Map.
- Source/Supply/Facility Name: Celebrate BIS
- Site ID:

- No. of Water Source/Supply/Facility: 1
- Source/Supply/Facility Name: Celebrate BIS
- Site ID:

- No. of Water Source/Supply/Facility: 1

- Source/Supply/Facility Name: Celebrate BIS
- Site ID:

- No. of Water Source/Supply/Facility: 1

- Source/Supply/Facility Name: Celebrate BIS
- Site ID:

- No. of Water Source/Supply/Facility: 1
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
<th>Raw Water</th>
<th>Treated Water</th>
<th>Minimum/Range</th>
<th>National</th>
<th>Ideal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conductivity</td>
<td>μS/cm</td>
<td>2.99</td>
<td>1.99</td>
<td>0.0</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Turbidity</td>
<td>NTU</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>Chlorine, Free</td>
<td>mg/L</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>Chlorine, Total</td>
<td>mg/L</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>Total Coliform</td>
<td>CFU/100mL</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td></td>
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<tr>
<td>Fe &amp; Other Metals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alkalinity</td>
<td>mg/L</td>
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<td>0.0</td>
<td>0.0</td>
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<tr>
<td>Ammonia</td>
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<td>Cobalt</td>
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<td>Nitrates &amp; Nitrates</td>
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<td>Thallium</td>
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<tr>
<td>Turbidity</td>
<td></td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td></td>
</tr>
</tbody>
</table>

*Note: All water in the area should be sampled if part of project.*
## Water Missions International


<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>St. Cecilia’s Girls School</td>
<td>Marcy Spring - Water Well</td>
<td>08/03/14</td>
<td>Water Source/Sanitation Facility</td>
<td>11</td>
</tr>
</tbody>
</table>

#### 7. Who is charged to use the source/supply/facility?
- Yes
- No
- Don’t know

#### 8. Describe any existing practices (water source/supply only):
- Name:
- Parish (church):
- Other:

#### 9. Priority of Source/Supply/Facility to Population

**Water Source/Supply/Facility**

- Quantity (L/day):
- Access:
- Reason:

**Sanitation Facility**

- Type:
- Main Source:
- Other:

#### 10. How is water from this source/supply used? (water source/supply only, check all that apply):
- Drinking
- Washing
- Cooking
- Hygiene
- Sanitation
- Laundry
- Irrigation
- Livestock
- Other:

#### 11. Is it likely that the water is contaminated? (water source/supply only)
- Yes
- No
- Don’t know

#### 12. If “yes,” which contaminants are likely in the water? (water source/supply only, check all that apply):
- Bacteria
- Viruses
- Nitrates
- Arsenic
- Iron/Manganese
- Lead
- Other:

#### 13. Has the water been tested by a laboratory? (water source/supply only)
- Yes
- No
- Don’t know

#### 14. If “yes,” which parameters were reported to be above acceptable limits? (check all that apply):
- Conductivity
- pH
- Turbidity
- H2S
- Hardness
- Chloride
- Lead
- Iron
- Suspended solids
- Total Coliform Bacteria
- Other:

#### 15. What lab performed the test? (water source/supply only)
- Name:
- City:
- Country:

#### 16. Does the community consider the source/supply safe to use? (water source/supply only)
- Yes
- No

#### 17. Is the community satisfied with the service level provided by this source/supply/facility?
- Yes
- No

#### 18. Does the community prefer this source/supply/facility over others that were identified?
- Yes
- No

#### 19. Will the community allow the water project to use the source? (water source only)
- Yes
- No

#### 20. Which factors are likely to limit access to the source/supply/facility, especially for the vulnerable and disabled?
- Distance
- Cost
- Access
- Other:

#### 21. At which times during the day is the source/supply/facility consistently available? (check all that apply)
- Morning
- Mid-day
- Evening
- Night

#### 22. Is the source capable of providing sufficient water during the dry season? (water source only)
- Yes
- No

### Additional Social Observations Related to Source, Supply, or Facility:

**Question 22:** Answer was “YES” because it was told the source has never run dry. Whether water is sufficient for a future project is unknown.

The water delivers after a few minutes out of the well.

**Compiled By:** [Insert Name]
**Date:** 08/03/14
**Rev.:** 4 (11 Feb 14)


<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>St. Cecilia’s Girls School</td>
<td>Marcy Spring - Water Well</td>
<td>08/03/14</td>
<td>Water Source/Water Supply</td>
<td>5867314</td>
</tr>
</tbody>
</table>

#### 7. Well Head/Access Condition
- Acceptable
- Unacceptable

#### 8. Existing Pump Type
- Hand Pump
- Mechanized
- N/A

#### 9. Existing Pump Condition
- Functioning
- Not Functioning
- N/A

#### 10. Well Depth (ground surface to bottom):
- 450

#### 11. Static Water Level (ground surface to water surface):
- 280

#### 12. Seasonal Turbidity Change
- Yes
- No

#### 13. Well capable of providing a sufficient quantity of water during the dry season?
- Yes
- No
- Don’t know

#### 14. If “yes,” how many months?
- 15

#### 15. Has a professional yield test been performed on the well?
- Yes
- No

#### 16. If “Yes,” Dynamic Water Level (ground surface to water surface, after pumping):
- 280

#### 17. If “Yes,” Dynamic Water Level (ground surface to water surface, after drying):
- 180

**Answer questions 19-24 only if source is a lake, river, or other type of surface water**

**19. Current Water Depth:**
- 180

**20. Seasonal Water Depth Change:**
- Minimum

**21. Is source capable of supplying 10 gallons of water for 8 hours a day without being depleted or causing current users to run out of water?
- Yes
- No
- Don’t know

**22. Is water consistently available from the source throughout the year?
- Yes
- No
- Don’t know

**23. Monthly/Times When Water is Not Available:**
- Yes
- No

**24. Seasonal Turbidity Change:**
- Minimum

**25. Has measures been taken to develop the spring and protect it from contamination?
- Yes
- No
- Don’t know

**26. If “Yes,” describe these measures:**
- Location
- Functionality
- Location
- Functionality

**27. Current Yield:**
- 280

**28. Seasonal Yield Change:**
- Minimum

**29. Seasonal Turbidity Change:**
- Minimum

**30. Origin:**
- N/A

**31. Presence at Extraction Point:**
- Yes

**32. Flow at Extraction Point:**
- 280

**33. Seasonal Flow Change:**
- Minimum

**34. Temperature:**
- Minimum

**35. Discharge:**
- Minimum

**36. Estimated Downstream Demand:**
- Minimum

**37. Is water consistently available from the piped system throughout the year?
- Yes
- No
- Don’t know

**38. Monthly/Times When Water is Not Available:**
- Yes
- No
- Don’t know

**Additional Technical Observations Related to Source or Supply:**

**Compiled By:** [Insert Name]
**Date:** 08/03/14
**Rev.:** 4 (11 Feb 14)
### Water Quality Report

**St. Cecilia's Girls School**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
<th>Raw Water</th>
<th>Treated Water</th>
<th>Recommended Value</th>
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</thead>
<tbody>
<tr>
<td>Conductivity</td>
<td>µS/cm</td>
<td>484</td>
<td>2,000</td>
<td>2,000</td>
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<tr>
<td>pH</td>
<td></td>
<td>6.2</td>
<td>6.5 - 7.5</td>
<td>7.0</td>
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<tr>
<td>Turbidity</td>
<td>NTU</td>
<td>5.82</td>
<td>5.0 - 10</td>
<td>10</td>
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<tr>
<td>Chlorine, Free</td>
<td>mg/L</td>
<td>0</td>
<td>0.5 - 1.0</td>
<td>0.5 - 0.5</td>
</tr>
<tr>
<td>Chlorine, Total</td>
<td>mg/L</td>
<td>0</td>
<td>0.5 - 1.0</td>
<td>0.5 - 1.0</td>
</tr>
<tr>
<td>Total Coliforms</td>
<td>CFU/100ml</td>
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<td>0</td>
<td>0</td>
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<tr>
<td>Fecal Coliforms</td>
<td>CFU/100ml</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Alkalinity</td>
<td>mg/L</td>
<td>200</td>
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<tr>
<td>Ammonia</td>
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<td>0</td>
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<td>0.05 - 0.5</td>
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<td>Iron</td>
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<tr>
<td>Manganese</td>
<td>mg/L</td>
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<td>Nitrite</td>
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<tr>
<td>Phosphate</td>
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<td>Sulfate</td>
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<td>0.1 - 1.5</td>
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<tr>
<td>Arsenic</td>
<td>µg/L</td>
<td>0.01</td>
<td>10</td>
<td>10</td>
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</tbody>
</table>

**Notes:**
- Conductivity test should be sampled in excess of 24 hours.
- The reagent should be added to the sample in excess of 24 hours.
- pH should be measured immediately after the reagent is added.
- The alkalinity test should be sampled in excess of 24 hours.
- The ammonia test should be sampled in excess of 24 hours.
- The chloride test should be sampled in excess of 24 hours.
- The copper test should be sampled in excess of 24 hours.
- The iron test should be sampled in excess of 24 hours.
- The manganese test should be sampled in excess of 24 hours.
- The nitrate test should be sampled in excess of 24 hours.
- The nitrite test should be sampled in excess of 24 hours.
- The phosphate test should be sampled in excess of 24 hours.
- The sulfate test should be sampled in excess of 24 hours.
- The fluoride test should be sampled in excess of 24 hours.
- The arsenic test should be sampled in excess of 24 hours.

**Sample Photos:**

*Raw Water Sample* - [Image of raw water sample]

*Treated Water Sample* - [Image of treated water sample]
Chepareria St. Cecilia Girls - Assessment on 16th July 2014

Community Development Summary

1. Background Information
   I. St. Cecilia Girls High School is in West Pokot County. The school borehole was drilled in 2001 by UNICEF initially. It was used as hand pump. However, in 2005, a solar-powered pump was installed by Grundfos.
   II. The solar powered panel proved quite beneficial and the school had more than sufficient supply of water and could supply water to the neighboring vocational training institute Mercy Centre. Also the community benefited because they had a water point at Mercy Centre.
   III. In 2004, after one year of installation the solar powered pump broke down and the school contacted Grundfos who had it repaired through Davis & Sheriff. The pump worked well for a while until it was repaired; however, it again broke down in 2005 and was replaced with another solar powered pump that again broke down in 2007. The replacement in 2007 cost the school KES 240,000. This was really constraining the school budget and they therefore opted for a longer lasting solution. (Appropriately the solar pumps were Davis & Sheriff's products not Grundfos) Upon consulting with Davis & Sheriff they advised the school to switch to an AC powered pump. This was done in 2008. Indeed it really worked well as there has never been any breakdown since installation. An ongoing challenge is the electricity bill all the time on the school budget. They pay a monthly fee of up to KES 54,000.
   IV. St. Cecilia Girls Chepareria has a total population of 600 students and 70 non-teaching staff together with their families. Teaching staff residing in the compound together with their families adds up to about 100. Mercy Vocational Centre has a population of 200 students and resident staff.
   V. Community members getting water at the community point in Mercy Centre adds up to 322 people, while at Chepareria sub district hospital it has a bed capacity of 30 patient and 25 staff and their families.
   VI. St. Cecilia Girls is 18 km away from Malakwara, the nearest major town in the region.
   VII. The main economic activity is farming and the average community income KES 6,000 monthly.

2. Water History
   I. St. Cecilia Girls Chepareria Girls has a drilled borehole while Mercy Centre has a shallow well. Both are permanent sources and are not salty. St. Cecilia Girls borehole water appears to be clear while the shallow well at Mercy Centre is cloudy and yellowish (iron) in color.
   II. The water at St. Cecilia Girls borehole was tested by a lab and said to be suitable for human consumption but results are not available.
   III. Currently the government does not have any plans regarding the water project in the community. The school has an SRUK-18 model pump while Mercy Centre has a Davis & Sheriff pump. Both of them are functioning.

3. Beneficiaries
   • 770 students and members of staff of St. Cecilia Girls Chepareria.
   • 300 students and staff of Mercy Centre.
   • 55 patients and staff of Chepareria Sub district hospital.
   • 322 community members are expected to benefit from the water project.

4. Health & Hygiene Promotion
   i. Standard H&I training will be implemented to students and teachers.

5. Management & Safe Water Committee (SWC)
   i. Institutional managed project by St. Cecilia Girls Chepareria school management.

6. Contributions
   i. The community will provide land, right-of-way, locally available materials (sand) and unskilled labor for free. Other materials are not available locally.

7. Sustainability
   I. The school is responsible for all running costs. The school will collect water fee from hospital and Mercy Centre to be used for maintenance expenses.
   II. Mercy Centre and the hospital will have water meter and charged per cubic meter. The school has a vote here for water in the school budget.
   III. The school has a bank account. In addition it has proved capable of raising funds and manage necessary repairs.
   IV. Savings are expected from reduced electricity bills while using solar power.

8. Final Comments
   I. One of the major constrains and for limited water supply are the high electricity bills for powering the AC pump.
   II. The main focus of the project is the refurbishment of the initial installation (solar power and pump) and the addition of treatment for St. Cecilia Girls School. See further details on the engineering solution.
   III. Excess water from solar production and additional water using electric power grid can be provided to neighboring institutions and community. Costs can be covered and income for the school generated through appropriate tariffs and metered connections.

Though the school management has proofed its capacity, WMA would provide additional sustainability training and guidance on water price and savings to make for replacements.

9. Media Link
   [https://sitesweb.google.com/a/1127712162894256555/chepareria](https://sitesweb.google.com/a/1127712162894256555/chepareria)
Observations & Findings

The community is composed of 4 institutions namely, St. Cecilia Girls School, Mercy Vocational Center, Mercy Convent and Chesperi Sub-District Hospital. The current main water source is a 70m borehole that yields 2 m³ per hour according to a drilling report. Previously the well had a solar pump installed but because of several break downs of solar pumps (probably not Greenfield) it was replaced with an AC pump (Grunflos 2kW-110V pump) in 2008. The school complains that the current electric bill from this is proving prohibitive to the sustainability of the project. As such they have cut-off connections to where they previously distributed water i.e. the Mercy Vocational Center; this was done to reduce costs. The current school system involves a rationing regimen to aid in cost cutting on the electric bill.

The Mercy Convent has a mechanized shallow well but chemical parameters of the water within make it unfit for use apart from laundry and gardening. Water for human consumption is purchased as bottled water. St. Cecilia School is willing to supply the other three institutions for a fee with water.

The water project was functioning at the time of the visit. Though the initially installed solar pump was replaced and solar panels disconnected.

Proposed Engineering Solution

From the assessment and designs, the team proposes that this project be provided with:

1. The existing Grundfos system would be refurbished:
   a. Flush the borehole to renew depth and flow within the borehole.
   b. Conduct a yield test to establish current the safe discharge of the borehole.
   c. Install a solar submersible pump rated at the safe discharge capacity and CUD200
   d. Replace the old solar panels with modern high yield panels.
   e. Reurn the main feeding line to the main tank.
   f. Replace the staff quarter tank (2,000 L) with a new 3,000 L PE tank to be used as the main distribution tank. This tank will have an automatic float switch installed.
   g. Repair the main Ferro-concrete tank at St. Cecilia
   h. Reurn borehole pipe assembly
   i. Install water meters to each institution to gauge usage and aid in billing
   j. Connect the Girls school tap stands with water from the main distribution line.

2. Following components would be added:
   a. Borehole casing/closure with manhole
   b. Enclosure (for water treatment, transfer switch, CUD200) + Chlorinator (water treatment)
   c. Secure solar panel frame (WAFI design)

This proposed system will be able to deliver 15,000 L of water daily; assuming a yield of 10 GPM and 8.5 hours of daily solar operation — sufficient for St. Cecilia Girls School. With the use of electrical power grid production can be tripled, sufficient for all the neighboring institutions and community members.

Assumptions/Basis:
1. Borehole yield is sufficient.
Pump House

Water quality test being conducted at one of six access points
Guarantee Success?

• No
• Minimizes risk associated with failure
Kenya 23: Challenges

**Technical Challenges**
- Chlorinator failures
- Failed boreholes (wells)
- High concentrations of dissolved contaminants in water sources (iron and manganese) create long-term maintenance issues
- Limited groundwater available
- Remote communities are challenging to reach
- Limited communication: No cell phone reception in a number of locations means communities cannot reach us
- Intermittent satellite coverage limits remote monitoring at times
- Bad data
- Other groups (NGOs and government) unintentionally disrupting community development initiatives

**People Challenges**
- Men hold the purse strings, have multiple wives, are unwilling to pay for water, and have little concern for the effort to fetch contaminated water
- Currency issues: Some of the communities don’t have money (they operate on a barter system)
- Government mandates of free water during the height of COVID-19
- COVID-19 related school closures – institutions are significant income contributors and contributed very little in 2020
- Nomadic people groups
- Community engagement model at the time had Water Mission transitioning the project to the community and then phasing out after 12 months
  - Without ongoing support, some projects struggle
Two-thirds of the Kenyan population lives in poverty below $3.20 per day.
Pump House

Safe Water Committee

Chlorination Device

Pump Controls

Solar Array

St. Cecilia Girls Sch. Chepateria
Safe Water Project was funded by Grundfoss Foundation
And implemented by Water Missions International
Officially commissioned on 30th May 2015

By H.E. Hon. Titus Loti Loite Deputy Governor West Pokot County.

Water quality test being conducted at one of six access points
St. Cecilia’s Timeline
• May 2015 – Commissioning
• Mar. 2016 – Pressure burst
• Aug. 2016 – Pump failure (1)
• Feb. 2017 – Pump failure (2)
• Jan. 2019 – Remote monitoring
32,000 Liters Pumped Jan 19, 2019

Water Flow (Liters)

Date
St. Cecilia’s Timeline

- May 2015 – Commissioning
- Mar. 2016 – Pressure burst
- Aug. 2016 – Pump failure (1)
- Feb. 2017 – Pump failure (2)
- Apr. 2019 – Pump failure (3)
- Sep. 2019 – Flow Meter stuck
- Nov. 2019 – School closed
- Aug. 2020 – Pump failure (4)
- Jan. 2021 – Borehole failed
- Nov. 2021 – New borehole
- Mar. 2022 – Water flowing

Safe Water Committee
St. Cecilia’s Timeline

- May 2015 – Commissioning
- Mar. 2016 – Pressure burst
- Aug. 2016 – Pump failure (1)
- Feb. 2017 – Pump failure (2)
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St. Cecilia’s Timeline

- May 2015 – Commissioning
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- Jan. 2021 – Borehole failed
- Nov. 2021 – New borehole
- Mar. 2022 – Water flowing
Dynamic Water Level

Static Water Level

Submersible Pump

Ground Level

Water outlet

Well Depth [ft]

Historical data for Low Level Alert at Grundfos Solar BH based on selected data

17 Jun 18 - 20 Jul 18

19 Jul 18 - 22 Jul 18

22 Jul 18 - 25 Jul 18

25 Jul 18 - 28 Jul 18

28 Jul 18 - 31 Jul 18

31 Jul 18 - 3 Aug 18

4 Aug 18 - 7 Aug 18

Historical data for Low Level Alert at Grundfos Solar BH based on selected data
St. Cecilia’s Timeline

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- Mar. 2016 – Pressure burst
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- Nov. 2021 – New borehole
- Mar. 2022 – Water flowing
ST. CECILIA GIRLS SCH. CHEPARERIA
SAFE WATER PROJECT Was Funded By
GRUNDFOSS FOUNDATION
And Implemented By
WATER MISSIONS INTERNATIONAL
Officially Commissioned On
30TH MAY 2015
BY H.E. HON. TITUS LOFEDE
DEPUTY GOVERNOR WEST POKOT COUNTY.
Kamukuywa

Solar Array
Remote Monitoring Transmitter
Elevated Water Storage
Pump Controls
Water Level Sensor (in Borehole)
Flow Meter
Borehole
Relic
Kamakuywa’s Timeline

- Spikes in flow are market days
- Jul. 2021 – Low consumption
- Sep. 2021 – Leak
- Nov. 2021 – Pressure break
- Feb. 2022 – Bad data
Dynamic Water Level

Static Water Level

Submersible Pump Level
Avg. $200/mo.
Income

Avg. $70/mo.
Expense
$1,800 Savings
Pre-Paid Water Metering
Solar Panel
AQTap
Water Dispensed
Hand Washing Station
Ngengechwo
Ngengechwo Safe Water Project
Men hold the purse strings, have multiple wives, and are unwilling to pay for water. They don’t care about how hard the work is for their wives to fetch contaminated water.
Ngengechwo's Timeline

- Aug. 2019 – Startup struggles
- Jun. 2020 – Pressure break
- May. 2021 – Pump controller failed
- Oct. 2021 – Operator is MIA
- Mar. 2022 – Pressure break

Multiple Pressure Breaks Due To Operator Turnover and Training Issues

Pump Controller Failed – Due to Lightning Strike - Replaced by Water Mission
~$460 Savings
“COVID-19 has negatively affected our income-generating activities. Many have lost their jobs and some businesses are not doing as well as they did before, thus leading to a decrease of resources among community members, which in turn has affected livelihoods.”
—Christopher Keris, SWC Chairman

“The water is always available and can be accessed at any time during the day. This has made my work easier as a mother and wife because the role of fetching water in my community unfairly lies on women. Conflicts have reduced because there is no more overcrowding as previously experienced at the borehole where the hand pump was. There were always struggles between the school children and community members to pump water which was equally very hectic. Whenever the hand pump broke down, we had to wait for a long time before it was repaired. During such times, we would be forced to walk for over three kilometers to get water. We thank God for this safe water project and we commit to take good care of it and doing everything we can to ensure its sustainability.”
—Eunice Korikou, housewife
Lessons Learned
Kenya 23: Challenges

**Technical Challenges**
- Chlorinator failures
- Failed boreholes (wells)
- High concentrations of dissolved contaminants in water sources (iron and manganese) create long-term maintenance issues
- Limited groundwater available
- Remote locations
- Limited communication: No cell phone reception in a number of locations means communities cannot reach us
- Intermittent satellite coverage limits remote monitoring at times
- Bad data
- Other groups (NGOs and government) unintentionally disrupting community development initiatives

**People Challenges**
- Men hold the purse strings, have multiple wives, are not willing to pay for water, and have little concern for the effort to fetch contaminated water
- Currency issues: Some of the communities don’t have money (they operate on a barter system)
- Government mandates of free water during the height of COVID-19
- COVID-19 related school closures – institutions are significant income contributors and contributed very little in 2020
- Remote communities are challenging to reach
- Nomadic people groups
- Community engagement model at the time had Water Mission transitioning the project to the community and then phasing out after 12 months
  - Without ongoing support, some projects struggle

Lessons Learned
Aug. 2021 – Started calling communities and getting photos of financials

Oct. 2021 – Started follow up visits; the plan is to visit each community twice a year

Next Steps

- MOUs in place with county governments
  - Clarify responsibilities and cost sharing for supporting projects

Has huge potential
Uptime = $\frac{\text{Days of Water Availability}}{\text{Days of Water Demand}}$
RWC PROGRAM GUIDE: A STRATEGY FOR LONG-TERM MONITORING AND SUPPORT

Kenya 23 Revisited: Water Builds Change

Kenya23 & Kenya23NL Average Uptime

- >90%

Included in Formalized Long-term Support Program
Not Enrolled in Long-term Support Program

2019 2020 2021 2022

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Learn how our improved results-based contract design is supporting rural water services for c. 1.5 million people in seven African countries.