Why Green to Clean?
The rural Ecuadorian community of Santiago de Quito sought assistance in dealing with their water quality when their water started to turn their cooked rice green. Bruce Rydbeck of Life Giving Water invited the team to join on creating a solution. Team Green to Clean contributed to the project by evaluating the current water quality and distribution system, and proposing designs for updating the system.

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Disinfection Recommendations
Objective:
Design a disinfection system that is cost effective, easy to operate, and aesthetically pleasing (doesn’t produce unpleasant tastes or odors).

Solution:
❖ Chlorine disinfection is easily accessible and inexpensive.
❖ Residual of 0.3 mg/L (0.2+ mg/L required by Ecuadorian government).
❖ Sodium hypochlorite solution from salt and water.

\[ \text{NaCl} + \text{H}_2\text{O} + e^- \rightarrow \frac{1}{2}\text{Cl}_2 + \text{NaOH} + \frac{1}{2}\text{H}_2 \]
❖ Batch (single cell) electrolysis.
❖ Peristaltic dosing pump.
❖ $42.66 / year.

Distribution Recommendations
Objective:
To design a distribution system with a pumping station and storage tanks to service 360 homes and 6 community centers, assuming 75L/day (20gpd) per person. The final design was evaluated using EPANET models.

Solution:
❖ A new well with a maximum capacity of 51gpm that will support the projected community growth for the next 20 years.
❖ Two pressure zones, upper and lower, that will maintain pressures between 10-70m (14-100psi).
❖ Pump house design with two pumps and distribution lines to separately bring water to the upper and lower presser zones.
❖ Four reservoirs, three 80 m³, one 20 m³.