

検査項目	WASAC 基準値	原因	症状・影響	対策
pH	6.5~8.5	<p>酸性 5.8&gt; : 酸性雨、酸性剤の過剰添加</p> <p>塩基性 8.6&lt; : セメント(水酸化カルシウム)、次亜塩素酸ナトリウム/カルシウムの過剰添加</p> <p>その他 : 自然由来、pH調整されていない工場排水、浄水処理不良等</p>	<p>高pH:低ナトリウム血症、下痢、飲用時の苦み</p> <p>低pH:配管が錆びやすくなる、ポンプの酸化(India Mark IIはpH6.5で鉄製部分が溶出)、飲用時の酸味</p>	浄水処理の改善、適切な排水処理
硝酸態窒素	45 mg/L未満	家畜の糞尿、肥料、生活排水	メトヘモグロビン血症(特に乳幼児の窒息死の原因)、発がんリスク	適切な施肥、家畜糞尿の処理、水源周辺に保護柵設置
アンモニア態窒素	0.5 mg/L未満	家畜の糞尿、肥料、生活排水	—	同上、塩素剤添加
フッ素	1.5 mg/L未満	自然由来	歯のフッ素症、骨フッ素症、消化器官や神経の異常	凝集ろ過、代替水源の利用
鉄	0.3 mg/L未満	自然由来 パイプやポンプ鉄製部品の錆(India Mark IIはpH6.5で鉄製部分が溶出)	過剰摂取により疾病にかかる可能性がある、錆の味	パイプの交換、酸化ろ過
化学的酸素要求量	—	自然由来/生活排水由来の有機物(不純物の存在)	—	—
遊離残留塩素	0.2~0.5 mg/L	<不検出の原因> 投薬管理の不徹底、水道管の劣化、揮発、水中での反応による消化	下痢、嘔吐(不十分な消毒に起因)	水道事業者による適切な投薬管理、家庭での塩素剤添加
大腸菌/ 大腸菌群	不検出 (大腸菌群のみ)	家畜の糞尿、生活排水	下痢、嘔吐	煮沸/塩素消毒、水源周辺に保護柵設置
電気伝導度	1500 $\mu$ S/cm 未満	自然由来/生活排水由来の電解質(不純物の存在)	—	—

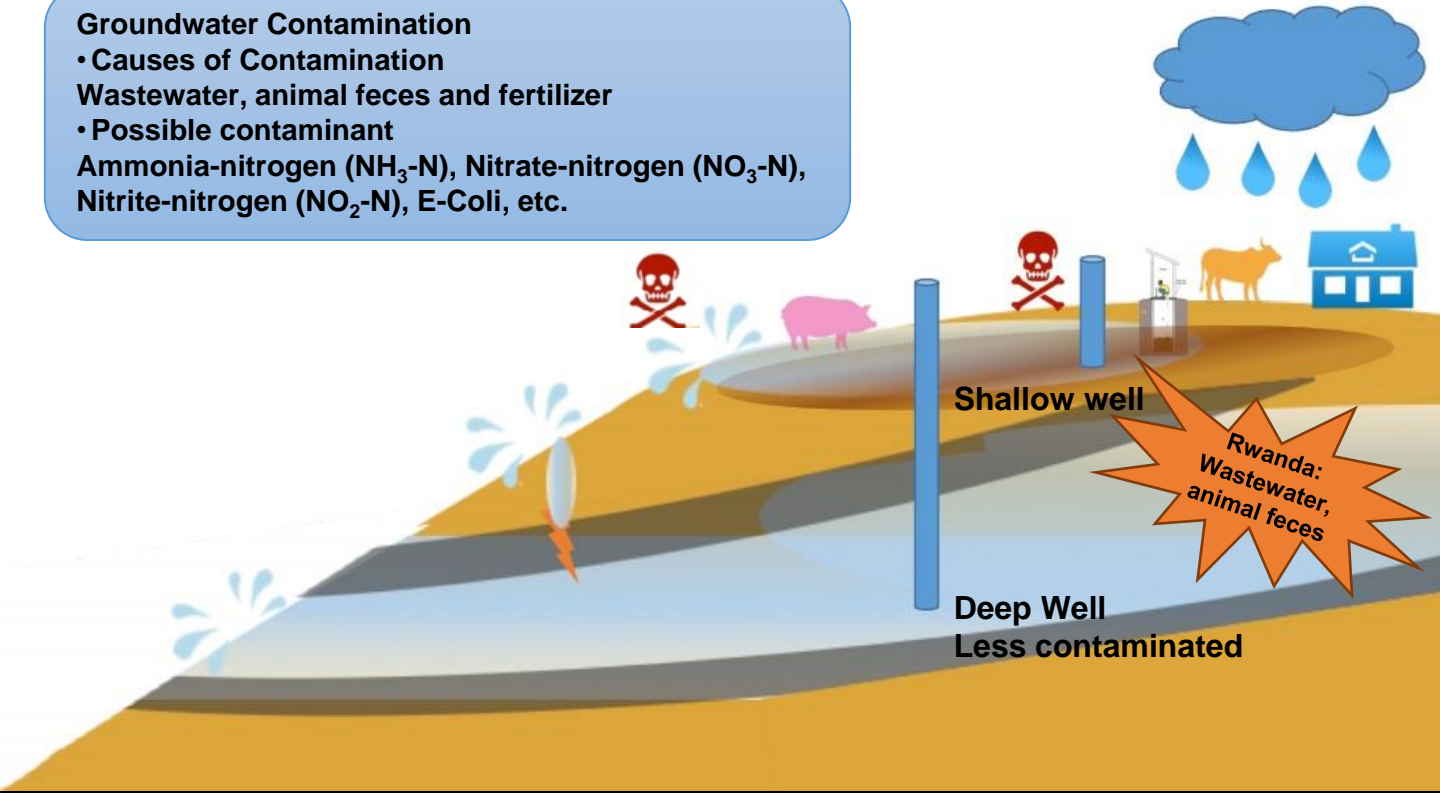
# Groundwater Contamination

## Groundwater Contamination

- Causes of Contamination  
Wastewater, animal feces and fertilizer

- Possible contaminant

Ammonia-nitrogen ( $\text{NH}_3\text{-N}$ ), Nitrate-nitrogen ( $\text{NO}_3\text{-N}$ ), Nitrite-nitrogen ( $\text{NO}_2\text{-N}$ ), E-Coli, etc.



## Good example of a fence around a spring



Parameters (Ibyasuzumwe)	WASAC Standards (Ibipimo bya WASAC)	Causes	Symptoms/ Effects	Measures
pH	6.5–8.5	<p>Acidic (pH&lt;5.8): Acid rain, Excess acidic dosing</p> <p>Basic (pH&lt;8.6): Excess cement (calcium hydroxide) or sodium/calcium hypochlorite</p> <p>Other factors: Natural occurrence, pH-unadjusted industrial wastewater, Defects in treatment system, etc.</p>	<p>High pH: Hyponatremia, Diarrhea, Bitter taste</p> <p>Low pH: Rusty pipes, Rusting hand pumps (iron parts of India Mark II will react if pH is lower than 6.5), Sour taste</p>	-Enhance treatment capacity -Improve industrial wastewater system
Nitrate-Nitrogen	< 45 mg/L	Livestock excreta, Fertilizer, Household effluents	-Infant suffocation caused by methemoglobinemia - Risk of cancers	-Apply proper fertilization, -Control livestock excreta -Protect water source with fences
Ammonia-Nitrogen	< 0.5 mg/L	Livestock excreta, Fertilizer, Household effluents	—	-Apply proper fertilization, -Control livestock waste -Protect water source with fences -Chlorination
Fluoride	< 1.5 mg/L	Natural occurrence	Dental/skeletal fluorosis, Digestive system/nerve abnormalities	Flocculated filtration, Utilizing alternative sources
Iron (Ubutare)	< 0.3 mg/L	Rust of water pipe/hand pump, (iron parts of India Mark II will react if pH is lower than 6.5), Natural occurrence	Excessive consumption may cause diseases, taste of rust	Pipe replacement, Oxidated filtration
Chemical Oxygen Demand	—	Organic impurities in nature/domestic wastewater	—	—
Residual Chlorine	0.2–0.5 mg/L	< Factors of detection failure > Insufficient dosing management/control, Deteriorated water pipes, Volatilization, Consumed by reacting in water	Diarrhea/vomiting due to insufficient sterilization	Manage/Control dosing by water suppliers, Add chlorine at household
E.coli / Coliforms	not detected (Coliforms only)	Livestock excreta, Household effluents	Diarrhea, Vomiting	- Boil/Chlorinate water for sterilization -Protect water source with fences
Electrical Conductivity	< 1500 µS/cm	Impurities such as electrolytes in nature/domestic wastewater	—	—

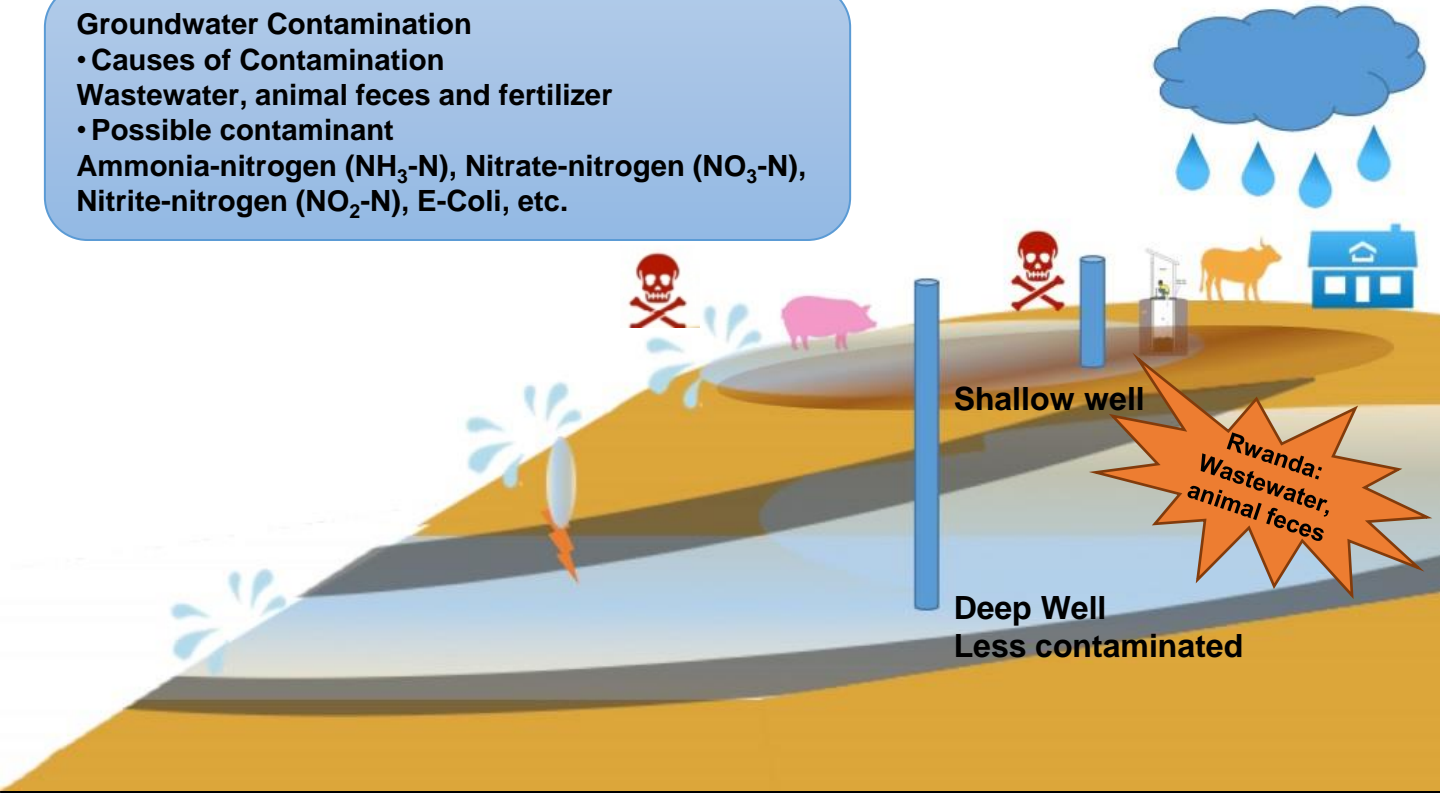
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