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WATER: **Environmental Compliance Requirements** **& ESDM Considerations**

Environmental Compliance/ESDM Training Workshops
Lake Naivasha, Kenya ■ January & February 2010



Water, Development & Human Needs. . .



Photo: Africa Renewal,
United Nations (vol. 21#3)

In SSA, diarrheal disease is the leading cause of death for children under 5, directly resulting in the death of ~2.6% of all children born in the region.

In addition to direct fatalities, diarrheal diseases worsen malnutrition and weaken the immune system, leading to decreased resistance to other diseases (e.g. Malaria.)

Ingesting contaminated water is the overwhelming cause of diarrheal disease.

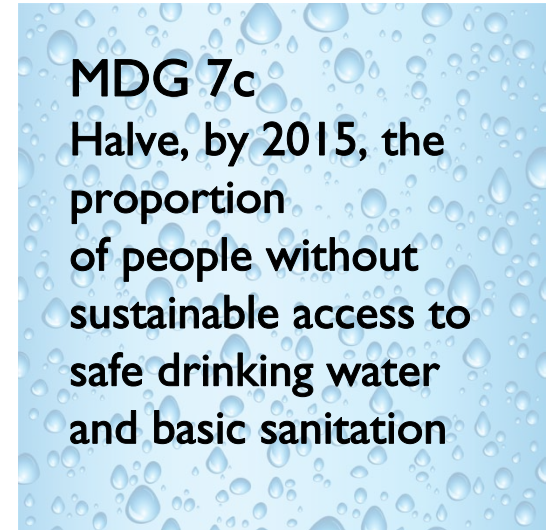
Poor access to water makes good hygiene difficult→thereby increasing disease

In many rural areas (particularly arid ones), time spent fetching water adversely affects girls' education and women's income-generation opportunities.



Therefore. . .

- ❖ **Water (& sanitation) has been and continues to be a key focus of USG and other donor assistance in Africa**
- ❖ **A “water focus” has been built into this workshop**
 - *Indicators exercise: water and sanitation sectors*
 - *Water an aspect of almost every field visit*
 - *This session*



USG: Paul Simon “Water for the Poor” act makes affordable & equitable access to potable water and sanitation a key component of U.S. foreign assistance.

Because water and health are so closely linked, water interventions have several important environmental compliance requirements. . .

Health Threat: Arsenic in Groundwater

- ❖ A potent & bio-accumulative poison → skin lesions, neurological disorders, skin lesions, heart & lung disease, cancer
- ❖ Occurs naturally in geologic formations and can move into groundwater
- ❖ No way to predict which formations contain arsenic. May be significant variations within an aquifer.
- ❖ Can be mobilized by human-induced changes to hydrology (mining, irrigation, flood control)
- ❖ In 1980s, widespread poisoning in Bangladesh/West Bengal (India) highlighted the issue

Today ~3000 Bangladeshis die each year of **As**-induced cancer; 2 mn live with chronic **As** poisoning

Poisoning occurred when villages switched from surface water to “cleaner” tube wells



Photo: UNESCO-IHE



Photo: USGS

Skin condition typical of advanced arsenic poisoning (China)



Test before the tap opens!

COMPLIANCE REQUIREMENT: Arsenic Testing

USAID policy requires:

TESTING of water supplied by any USAID-funded well/borehole for INORGANIC arsenic:

- Test initially (prior to public provision of the water and after the borehole “stabilizes”)
- Test quarterly thereafter for 4 quarters.
- Use the Hach Arsenic test kit (www.hach.com). (EZ test kit acceptable.)

If arsenic is at ANY time over 10ppb, test must be re-done by a qualified laboratory. If the result is confirmed, the well must be decommissioned.

Tests must be performed on EVERY well.



Photo: www.hach.com



Arsenic cannot be removed by common filtration or boiling

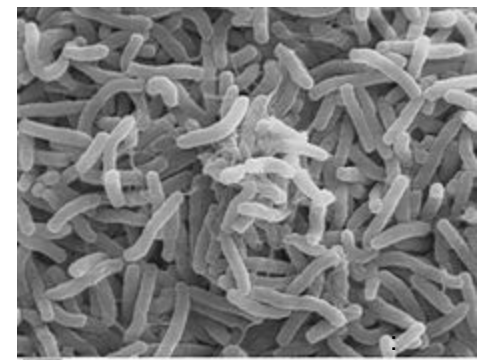
Health Threat:

Fecal-Oral Route Pathogens

- ❖ Ingesting water contaminated with fecal-oral route pathogens is the leading cause of diarrheal diseases
 - *Dysentery, Cholera, Typhoid, other gastroenteritis, (and also hepatitis, shistosomiasis. . .)*
- ❖ These diseases are a leading cause of infant & young child mortality
- ❖ Shallow groundwater easily contaminated by latrines, livestock, exchange with surface waters.
- ❖ Shallow wells tapping “clean” groundwater easily contaminated by dirty buckets, ropes, & soil.
- ❖ Water from boreholes can be contaminated by seepage thru a faulty sanitary seal or can be contaminated at the tap.



Entamoeba histolytica
(cause of amoebic dysentery)



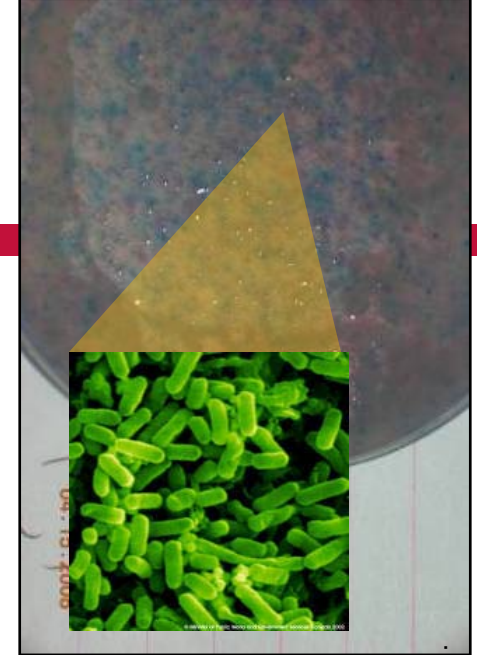
Vibrio Cholerae
(the cholera bacteria)



Key Indicator: Fecal Coliform

Fecal coliform bacteria species are not especially harmful themselves, but indicate that water is likely contaminated with fecal matter, and fecal-oral route pathogens may be present.

As we have seen, testing is easy and quick . . .

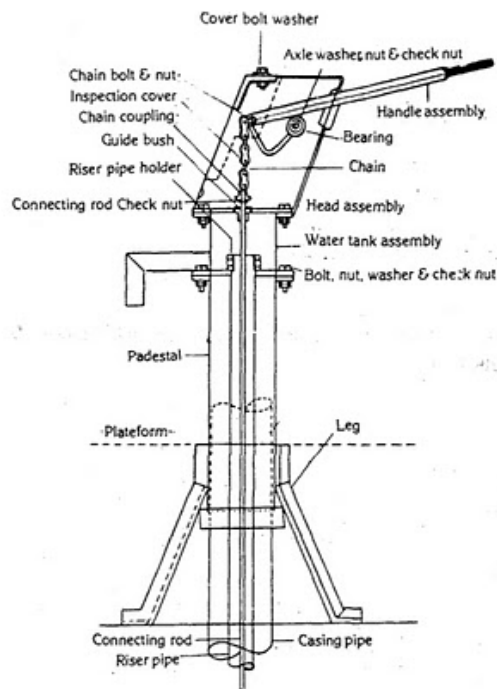


Test dish showing fecal coliforms (purple) and non-fecal coliforms (pink). Inset is magnified image of fecal coliform bacteria



COMPLIANCE REQUIREMENTS:

Fecal Coliform Testing, Best Practices



USAID AFR IEEs require:

1. TESTING of water supplied by any USAID-funded well/borehole/public tap for fecal coliform:

- As a practical matter, follow the same testing regime as arsenic, and test at the same time.
- If fecal coliform is detectable in an 100ml sample, water must be treated/filtered, source of contamination eliminated, or contamination route blocked.

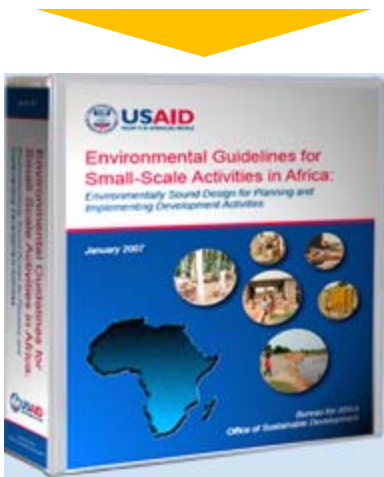
2. GOOD PRACTICES to minimize fecal-oral route transmission (and other problems)





Good practices. . .

IEEs define good practices by reference to the *Small-Scale Guidelines*



The basic minimum of “good practice” has been distilled into the **Visual Field Guide**—but this is not a substitute for the full *Guidelines* chapter.



Version: 1 December 2009
download at www.encapoffice.org/sectors/water.htm
comments and corrections to encapinfo@codrusgroup.com

ENCAP Visual Field Guide: WATER SUPPLY for quick identification of serious environmental concerns in small-scale water supply activities

About the ENCAP Visual Field Guide Series
ENCAP Visual Field Guides are intended for use during field visits by USAID and Implementing Partner staff who are not environmental specialists. They are intended to ensure that the most common serious environmental deficits in activity design and management are quickly and easily identified for corrective action.

Note that an activity may be subject to environmental design and management conditions specified in its Environmental Assessment or Initial Environmental Examination but not captured in this document.









The field guides complement the more detailed guidance found in USAID's Environmental Guidelines for Small-Scale Activities in Africa.

Consult the *Guidelines* for guidance regarding remedies, mitigation and corrective actions.

The *Guidelines* are available at www.encapoffice.org/egsa.htm.

Disclaimer: This field guide was prepared by The Cadmus Group, Inc. for International Resources Group, Ltd. (IRG) under USAID Africa Bureau's Environmental Compliance and Management Support (ENCAP) Program, Contract Number EPP1-00-03-0013-00, Task Order No. 11. Its contents are the sole responsibility of the authors and do not necessarily reflect the views of USAID or the United States Government.

PROBLEMS. A "YES" answer to any of the following indicates an environmental deficit in activity design or management. For USAID-funded activities, corrective action will be required. Notify the Chief of Party and the USAID Project Manager.

- 1. Is a tank or well supplying water for domestic use uncovered?**
 YES  Issue: Easily results in contamination of water with pathogens. Can provide breeding habitat for disease vectors, including mosquitoes. (Photo depicts uncovered well.)
 NO 
- 2. Is there stagnant water around the water supply point?**
 YES  Issue: May provide habitat for disease vectors and attract livestock (see below). There is a high likelihood that stagnant water around a shallow well will contaminate water in the well.
 NO 
- 3. Do livestock share the water supply point?**
 YES  Issue: Easily results in contamination of water with livestock feces & body fluids. May attract disease vectors (particularly flies) which are themselves a source of contamination.
 NO 
- 4. Is there soil erosion in the vicinity of the water supply point?**
 YES  Issue: Usually reduces the service period of the supply point by undercutting concrete aprons, well covers, and pump footings. Often leads to stagnant water around the supply point (see question 2, above).
 NO 

(Over)

Partners then translate the general IEE condition into specific practices in their EMMP