

GUINEA WORM CLOTH FILTER

Household Water Treatment and Safe Storage (HWTS) Product and Implementation Fact Sheet



Technology Description

Guinea Worm Cloth Filter (Vestegaard Frandsen S/A): The use of a cloth filter is a long-standing intervention for guinea worm prevention in endemic countries, of which Ghana and Sudan are the two most significant remaining endemic countries. Cloth filters have been used in certain parts of the world, such as India and Nepal, for centuries. In the 1980s, research into the application of cloth filters was sponsored by the World Health Organization (McCullough, 1985). Guinea Worm Cloth Filters have been field tested for social acceptability and durability and are now widely disseminated by the Guinea Worm Eradication Program (GWEP). The cloth filter used in Ghana is manufactured by the Swiss company, Vestegaard and it has pore openings of 100-120 micron pore size and the yarn size is 20 Deniers and 50 Deniers depending on product type. The Vestegaard cloth filters generally are 18 – 40 inch diameter; in Ghana one finds the 30 inch diameter cloth with 8x8 inch nylon center (the actual filter).

At the household scale, water is poured through the cloth with is attached by a drawstring, elastic or metal ring to filter out cyclops, the vector of the guinea worms, which cause dracunculiasis.

In guinea worm endemic areas of Ghana, one sees communal filtration units, as shown in the photo below from a dam site in the town of Savelugu. The metal holders containing the cloth filter fit over the metal drums used for water collection. One observes in this photo that the cloth filters are lying directly on the ground, where they are potentially in contact with other sources of water-borne contaminants (field observation in Ghana 2004-2007; personal communication with Vestegaard and the Carter Center/GWEP, 2007).



Scene of guinea worm cloth filters in use at dugout in Savelugu, Ghana (photo by K. Doyle, June 2007).

What contaminants does it remove (based on manufacturer's claims)?

The cloth filters out the cyclops which is the vector of guinea worms, which cause dracunculiasis in Ghana and the several other remaining guinea worm endemic countries. Cloth filters from Sari cloth applied in parts of Asia filter out copepods / plankton which are the vector of *Vibrio cholerae*.

How does it remove contaminants?

Physical straining

Capacity (flow rate and/or batch volume)

In Ghana, 44 L metal containers are among the most common for water collection by women. This volume of water takes less than one minute to pass through the cloth filter, hence about 44 L / minute.

Cost of technology per unit

Capital: In Ghana, the cloth filter is distributed for free as part of the Guinea Worm Eradication Program. Prices of the cloth filters without transport range between \$0.40 and \$0.90 per unit. With transport to Ghana, the Vestegaard cloth filter from the manufacturer in India, costs a total of more than \$1.00 per unit. Exact price is dependent on the volume purchased.

O&M: There is no O&M cost in using the filter. However, the cloth may have tendency to tear, so when this occurs, the cloth filter needs replacement.

Effective Household Water Management of this Product

Operation

- Fasten cloth to wide-mouth storage vessel and tighten string.
- Pour source water into the center of the cloth
- Allow the poured water to pass through the cloth before adding more.
- Do not exceed the capacity of the cloth to strain the water.

Maintenance/Cleaning

The cloth should be cleaned each day by washing with soap and clean water.

Replacement Period: N/A

Water Quality – Independent Results (Aikhomu, Brieger and Kale, 2000).

- Early studies where interest in cloth filter use was gauged by selling the cloth filters found that it was only possible to achieve 40 – 60% coverage of households.
- Sewn variety required training in proper use steps in order to prevent cyclops from inadvertently entering the drinking water pot.
- Frequent education by village health workers needed to reinforce and make new behavior habitual.
- Some villagers complained about inconvenience of tying cloth filters onto their pots.
- Filter cloth of either nylon or polyester rarely lasted a complete transmission season before developing tiny holes and tears.
- Villagers do not perceive tiny pin-prick holds as a threat.

- Some villagers reject cloth filters as a second-rate intervention compared to wells.

Health Impact Studies: N/A

Advantages

- Ease of use
- Could be locally produced, but is currently produced in India
- Effective in filtering out guinea worm cyclops and cholera copepods.
- Free to users

Disadvantages

- Drinking water can become contaminated if used incorrectly.
- User may not detect tiny holes/tears that occur with use
- Does not filter any other water-borne pathogens besides that causing guinea worm cyclops cholera.
- Users do not drive demand

Name of Implementing Organization

Vestegaard Frandsen S.A.
Guinea Worm Eradication Program

Type of Organization

Vestegaard Frandsen S.A is a private sector business.
Guinea Worm Eradication Program is an NGO.

Focus of Dissemination

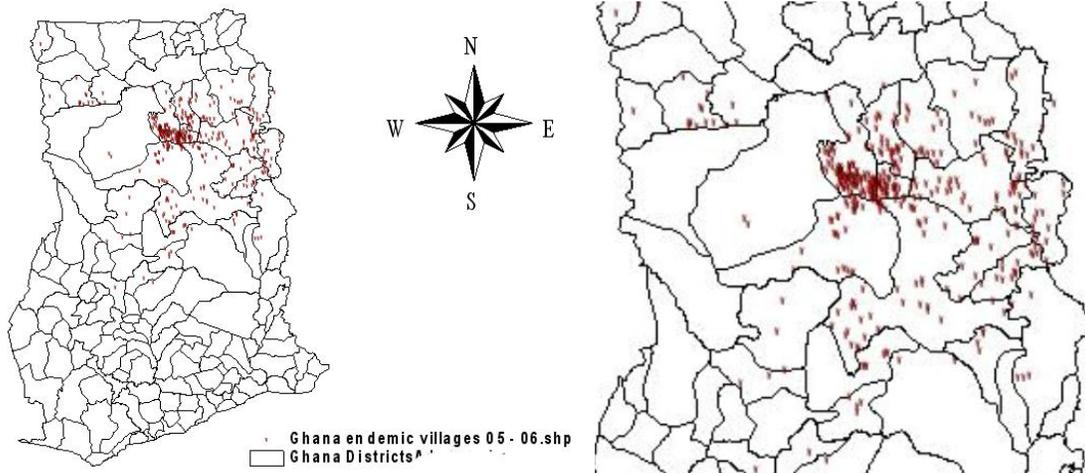


Figure 1: Guinea Worm Endemic Villages in Ghana (2006)

Implementation Approach

Free distribution (charitable donation)

The PATH Safe Water Project contributed to this research, which will inform a strategy for sustainable and scalable provision of Household Drinking Water Treatment and Safe Storage Devices.

Extent of Implementation / Sales

Number of units sold from Jan. 2003 to June 2007: 1.4 million units.

Vestegaard Frandsen S/A delivered approximately 300,000 cloth filters to Ghana in 2007, about 500,000 cloth filters in 2006, and about 600,000 cloth filters in 2005.

Plans for Expansion: Carter Center hopes to eradicate Guinea Worm in the coming several years, therefore, expansion of the cloth filter seems unlikely

References

Aikhomu, S.E., Brieger, W.R, and Kale, O.O. 2000. "Acceptance and Use of Communal Filtration Units in Guinea Worm Eradication." *Tropical Medicine and International Health*. Blackwell Science. Vol 5, No. 1. pp 47-52. Jan 2000.

McCullough, F.S. 1985. Cyclopoid Copepods: their Role in the Transmission and Control of Dracunculiasis." In: Opportunities for Control of Dracunculiasis (Ed. Board on Science & Technology for International Development. National Research Council) National Academy Press. Washington D.C. pp.65-76.

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Implementing Organization: Guinea Worm Eradication Program, which is a partnership between the Ghana Ministry of Health together with the Carter Center

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