

Pond Cleaning & Protection Guidelines – Cyclone Nargis, Myanmar

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the Technical Working Group of the Cyclone Nargis WASH Cluster
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Due to the high risks of contamination in surface water sources, pond-cleaning activities must be accompanied by public health promotion work directed at safe water treatment before consumption. For more information on health promotion messages for safe household water treatment, see annex.

Community Participation

- Strong levels of engagement with local people before, during and after pond cleaning is critical to effective relief operations. It is also a basic means of demonstrating accountability.
- As pond cleaning is an annual activity in the Ayeyarwady Delta region, local expertise is high. Many agencies have found that providing tools (including fuel for pumps) is all that some villages need to clean ponds.
- While men are typically involved in direct pond cleaning operations, women are more involved than men in collecting, storing and treating water. Understanding women's needs and views, and taking them into consideration, is important for a successful operation.

Cash for Work vs. Voluntary Labour

- Cyclone affected families need money, as well as materials and technical assistance. Cash for work (CFW) schemes can be an effective method of cleaning ponds and supporting local recovery.
- Consult with other agencies involved in local pond cleaning before implementing CFW schemes. If many agencies in nearby villages are using voluntary labour for pond cleaning, care must be taken when introducing cash for work schemes to avoid resentment or other disincentives to voluntary labour. *See annex for more information on considering cash for work schemes in emergencies.*
- Current labour costs (according to markets and operating agencies using CFW) are 2,000 kyats per person per day.

Pond Selection

- Most villages have one or two preferred ponds for drinking water, and others used primarily for irrigation. The drinking water pond(s) may not be the largest, or even the one(s) closest to villages. Consult with villagers (esp. women) to identify the pond they use primarily use for drinking water.
- While the priority should be cleaning drinking water ponds, villages may request assistance in cleaning nearby ponds as well. With a motivated labour force and tools / pumps on site, consideration should be given to cleaning other ponds as well.

Initial Drainage

- Manually breaching the embankment walls at one or two points is the typical way to rapidly drain a pond. Care must be taken with embankments that have a high sand content to avoid erosion and possible embankment failure. In areas where there is a lack of clay to add as a soil stabilizer when rebuilding sandy embankments, only pumps should be used to drain the pond.
- To avoid risks of flooding or mudslides affecting nearby buildings, latrines, and agricultural lands, ensure that the drained water is safely diverted to existing drainage ditches or watercourses.

Pumps and Pumping Strategies

- As cutting through embankment walls typically removes the top meter or so of water, pumping the remaining water is necessary. While pump selection typically depends upon the size of the pond and the static lift, locally available pumps and engines should be favoured. Local pumps are more familiar to villagers, and purchasing locally can contribute to a wider livelihood recovery than using imports.
- Two styles of pumps have been found useful for pond cleaning in the Delta:
 - Suction pump and engine: Chinese 4" suction model with 10 to 18hp diesel engine mounted to steel frame. Readily available in Yangon. Cost \$350 to \$1850. Recommended for static lifts of greater than 1.6 m.
 - Axial flow pump: Myanmar "Delecher" pump (\$200). Requires a separate agricultural diesel engine costing \$230 for 7.5 hp. Both items readily available in the Delta. Recommended for static lifts of less than 1.5 m.
- Using two or more pumps is recommended whenever possible, as this enables pumping of the average pond to be completed in a single day. Asking nearby villages to lend their pumps to each other has been a rapid and effective pond cleaning strategy for several agencies.
- In average sized pond (40 X 72 X 1.6 meters), fuel consumption per pond is likely to be 5 or 6 gallons for axial pumps, 10-15 litres for suction pumps. Oil consumption is approx. 2 litres per pond for the axial flow pumps, and 1 litre for suction pumps.
- The use of intake strainers to avoid debris blockages is critical for suction pumps. A one-inch diameter gaps in strainers has been found adequate, as have the use of large woven bamboo baskets as strainers.

Removing Debris and Deposits

- All debris and organic matter should be removed from the pond after drainage. A safe disposal site located away from other watercourses should be identified.
- Saline, acid sulfate and other mineral deposits are likely to be present on the pond bottom after draining. By using bamboo / timber / metal scraping tools, several inches of saline saturated soil can be removed. Care must be taken in areas with high water table to avoid excessive scraping, which could cause seepage and further saltwater intrusion.
- Soil removed from the pond bottom should not be used to raise the embankment height, due to risk of further contamination. All saline saturated soil should be safely disposed of, preferably away from the pond, agricultural lands, and watercourses.

Use of Lime (Calcium Oxide) in Pond Cleaning

- Calcium oxide (CaO) (lime) _____, is sometimes used during pond cleaning in Myanmar. The addition of lime to ponds (liming) increasing its alkalinity, raising pH levels in the pond as it fills. Higher pH levels can contribute to more rapid decomposition of organic matter that falls into the pond after it has been cleaned.
- Higher pH levels in pond water encourage flocculation and coagulation to occur. Flocculation helps clarify water and reduces turbidity, as it helps sediments from rainwater runoff and wind or rain blown debris to form flocs or clusters that can settle on the bottom of ponds.
- Some villages believe lime is necessary to chemically disinfect ponds after the cyclone. As lime is a caustic compound, it is an effective disinfectant. However, the disinfectant properties of lime rapidly diminish when exposed to air or moisture.
- Although liming ponds is not particularly effective method of reducing the salinity of pond water, some villages in the Delta cite this as the reason they add lime during pond cleaning. The perception that lime reduces saline water taste in pond water is most likely due to the hardening and adhesive quality of lime. When lime is mixed with clay soils at the bottom of the pond, it forms a plaster-like crust that reduces leeching from the saline saturated soils.

- Liming pond is best done after the pond has been drained, and organic material and the top layer of saline saturated soil from the bottom of the pond has been removed by scraping. For an average size pond (40 X 72 X 1.6 meters), fourteen to sixteen 10kg bags are spread along the pond bottom and tamped into the soil. Spreading lime over ponds that have partly filled with water is not particularly effective.
- Local people will generally indicate to agencies if they require liming as part of the pond cleaning process. Some agencies have adopted a “no request, no liming” practice.

Need for Repeated Cleaning

- Some agencies report that they have needed to return and re-clean ponds due to high salinity in the pond water. This is likely due to saline saturated soil on the pond bottom and sides. Drain and re-clean the pond as noted above.
- If local people still find the re-cleaned pond water unacceptable, request a community meeting to discuss their concerns and possible options (such as cleaning other ponds).

Pond Water Quality Monitoring and Testing

- As acceptable levels of salinity in water supplies depend upon local custom and previous exposure to saline water, rely on local knowledge over conductivity meters to determine salinity.
- Testing for e-coli bacteria in pond water is most useful when part of a health and hygiene promotion campaign on safe household water treatment. Make sure that test results are available from both the water source (pond) and from storage containers at random households. *See annex for more information on water quality monitoring and testing.*

Pond Protection & Regulating Access

- Reducing the risk of contaminants to drinking water ponds requires protective measures based on three key principles:
 - restricting activities around the pond;
 - restricting activities in the pond;
 - widespread support from the local community.
- Fencing off ponds using bamboo sticks or other materials can be effective in reducing the risks of faecal contamination by livestock or other animals (including humans). Grasses and low ground cover make for more effective “green fencing” than live bamboo or shrubs, as the latter have thirsty roots. Grass embankments also limits erosion.
- To permit easy access to a fenced pond, consider building wide steps or ramps (2-3 meters) leading up to the pond edge and into the pond. This will make it easier for people collecting water when using buckets on opposite ends of bamboo poles.
- Access to pond water can also take the form of platforms or jetties that extend into the pond water. Typically made of bamboo, platforms can either be fixed or floating on the pond surface. A sturdy guardrail should be attached to the platform or fixed on the pond bottom for safety when leaning into the pond to collect water.
- Bank mounted water lifting devices are also used in ponds in the Delta to help prevent water contamination. The simplest method is through a bamboo pole and bucket that swings from the pond onto the embankment. Foot operated pedal pumps are also common lifting devices used to transfer water from ponds. *See annex for more information on pumping devices, filters, and other methods of improving pond water.*

Annex 1 – Pump Case Study & Field Advice (World Vision/ MSF)

Parameter:	Example 1	Example 2
Pumping Head (Static lift)	Not more than 5 feet due to: - low pond embankment height, <i>or</i> - cutting of embankment with high clay content = reduced risk of erosion	Greater than 5 feet. Do not cut embankment if risk of erosion due to high sand content.
Typical Pond	130 x 250 x 5 ft	130 x 250 x 5 ft
Pump & Motor	Locally made 'Delecher' axial flow pump Cost US\$170-\$200. Size 10" by 10 feet. Engine separately mounted. Use stakes and twisted ropes pulling in opposite directions to apply tension to pulley belt.	Chinese made 4" suction pump with diesel engine mounted on steel frame. Cost ~US\$350 to 1850 depending on horsepower and model. Engine power = 10-18 h.p.
Fuel & oil consumption:	7.5 h.p. = 0.3 gallons per hour 5 gal total for typical 15 hours pumping of pond. 2 litres of engine oil per pond	- 10 gallons per pond (World Vision) - 10-15 gallons per pond. (MSF Swiss) 1 Litre engine oil
Process:	Set up on afternoon of 1 st day. Pump from 6am to 5pm on 2 nd day. Pump 1 hour every 2nd hour on 2 nd day = 4 hours pumping. On 2 nd day up to 100 villagers use 15 heavy rubber buckets (loaned from WV) to clean 1' of debris and 2.5' of silt.	Same as for Example 1. If using multiple pumps can almost always finish pumping in a single day.

Annex 2 – Bibliography & Resources

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WASH Cluster **Introduction to Hygiene Promotion –Tools and Approaches** CD-rom available at www.humanitarianreform.org

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