Reducing Solid Waste and Groundwater Contamination in Sri Lanka After the Tsunami

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If solid waste is not managed properly now, harmful effects such as groundwater contamination from debris will pose great threats for Sri Lanka's drinking water source and to human health. In the immediate aftermath of the tsunami, the first priority lay in the rescue and recovery of its citizens. Now, over a month after the disaster, the wreckage is being cleared and preventative measures in the management of solid waste are needed to minimize contamination of groundwater sources.

Potable water sources are at risk; we fear contamination is inevitable due to the enormity of the destruction and the required cleanup effort. However, immediate action to take the first steps toward proper solid waste handling will make a significant difference in keeping drinking water clean. These proper waste handling practices include the separation, removal, recycling, and safe storage of both vegetative and non-vegetative debris.

Waste Separation

Immediate action to minimize the presence of pollutants from dumpsite and burial site debris in groundwater will help reduce the long term impact of the tsunami on drinking water sources. Under the current tsunami disaster situation, it may not be practical to employ a system of waste separation where hazardous waste is identified and isolated from other debris. This would be the ideal system; however, it would not be practical or even feasible, due to the magnitude of the tsunami related debris and the time and labor it would require to identify the potential hazardous waste. In addition, there was no previously organized waste management practice in most or all of the tsunami-affected areas; most of the hazardous waste was recycled or reused along with other waste.

Even in countries with an organized system of hazardous waste separation, it becomes hard to implement when a disaster occurs. According to Selvendran, who works for the Florida Department of Environmental Protection in the United States, the waste separation system became impractical after the hurricanes hit Florida and as cleanup and recovery became the first priority.

As Sri Lanka recovers, it will be most effective for the country to separate and dispose of the debris based on the classifications, vegetative and non-vegetative. This separation of vegetative waste from the non-vegetative waste could take place at either the collection points or temporary staging areas.

Vegetative Debris

This vegetative debris is the largest portion of the debris produced during a tsunami disaster. The disposal of vegetative waste, such as trees, stumps, brush, and leaf litter does not typically result in groundwater contamination; such waste can be collected, stockpiled, land filled, used for firewood, as compost or as mulch.

Non-Vegetative Debris

The materials that remained after the recent tsunami included aggregates, wood, metals, gypsum, plastics, bricks, tiles, and asbestos roofing. The materials from the construction and debris class of debris can generally be recycled, however, materials containing asbestos need to be handled very cautiously. These materials should ideally be handled wet, and if possible, bagged and buried.

Two of the main classes of non-vegetative waste are aggregates and construction and demolition debris. Aggregate debris, such as asphalt pavement and concrete, results from the destruction of roadways. These materials, if separated, can be stockpiled and reused after reprocessing them to the specifications used for road base aggregate or solid fill material. The second class, construction and demolition debris is also a large component of tsunami debris. This debris is the result of the destruction of homes, commercial and non-commercial buildings, and other structures.

Most of the non-vegetative waste can also be reused or recycled. Any non-vegetative waste that cannot be reused or recycled must be carefully disposed in a properly managed dumpsite to avoid groundwater pollution. Based on site-specific conditions of geology and hydrogeology, a debris disposal site could be strategically located above the groundwater table and over a layer of densely pack soil, such as clay, that would act as a barrier to leachate entering the groundwater supply. This is the type of foresight and management practice that Sri Lanka will need to consider in order to safely manage its solid waste. Another alternative would be investing in a lined landfill that would help to prevent leachate penetration into groundwater. This would be a large capital investment that Sri Lanka may need to appeal to a donor agency to help fund.

Storage and Disposal Site Requirements

Some debris components have specific storage and disposal requirements such as the specific material of casing that contains it. Debris that consists of decomposing organic matter, chemicals, and fuels such as petrol, kerosene, and diesel could contaminate the groundwater for years to come unless a suitable location and dump site design is selected for burial.

The following guidelines should be used to locate the proper dump site:

- The site is located outside of an identifiable or known floodplain and flood prone, wetlands. (Due to local flooding brought on by the tsunami, the soil will currently be saturated in most places.)

- It is a minimum of 100 feet from all surface waters including small creeks, streams, watercourses, ditches that maintain seasonal groundwater levels, ponds, wetlands, and on-site buildings/structures, septic and drain fields etc.

- It is at least 250 feet from off-site residential dwellings, commercial or public structures, and potable water supply wells.

These guidelines will minimize the pollutants entering the watersheds and contaminating the aquifers that provide drinking water. This reduction of uncontrolled dumping and burial of debris will minimize non-point source pollution and bacterial concentration in drinking water. Debris dump site selection based on local geology and proximity to a water body is an important component of successful solid waste management. This type of management

system must be fostered within tsunami affected countries; a system cannot be imported from areas that have experienced similar conditions of flooding and destruction.