Proposed reduction of preventable deaths in rural Indonesia through stormwater harvesting and wastewater treatment

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ABSTRACT: *The aim of this project was to provide the villagers in Indonesia an alternative water source. Currently people living in villages gather water from locations such as: seasonal wells, contaminated rivers and swamps. Also this paper aims to remove the amount of contact people are currently having with open sewage systems; by implementing simple septic systems. The goal is to decrease the number of preventable sicknesses and deaths through these methods. This project is still being planned and created, hopefully to be accepted by the end of 2012.*

BACKGROUND: Of the 5 million cases of diarrhoea in the world each year, 1.8 million children die. Every year, at least one third of Indonesians suffer from water-borne diseases, including cholera, dysentery and typhoid fever, according to the Ministry of Health. The poorest 20% of Indonesia has a death rate for children under 5 years old at over 10%. These numbers and deaths are related; open sewers is a common source for the spread of disease and sickness. Access to clean water and sanitation can reduce the risk of a child dying by as much as 50%.

EXISTING CONDITIONS: While larger cities have greater access to clean water than most areas of Indonesia (35%), there is no reliable information from the rural areas. Studies showed that there are 29 villages with great need of clean water. The following information has been collected:

- Access to drinking water changes from village to village. The villagers collect water either from: rivers, wells, ponds/swamps or a supply truck that comes from the city.
- Most villages only have one method of collecting drinking water while few have a range of sources.
- Bathing is typically done in the river with some villages collecting water from wells and ponds/swamps.
- Washing clothes etc., uses the same sources of water.
- All human wastewater goes into the river untreated. There are some septic tanks near the ponds/swamp next to the houses; however they do not work properly.

The most common method of treating water in the household is by boiling the water for up to 10 minutes. One of the aims of this project is to provide an option for these villagers to access clean water with little money from outside of their communities or government. It is important to work with the villages and the community leaders to achieve these aims

LIMITATIONS: The villages are placed on the river flood plains, in swamp areas or inland with limited access to groundwater. To reach these villages' people mainly use boats or motorbikes, as using cars or trucks can be difficult. This means that when building anything, an understanding of local flooding and river flooding is important. Materials used will have to be found from local stores to reduce the cost of the project.

The culture within these villages will have to be considered for this project to work. Studies have shown that people are happy to use rainwater although their reasoning changes from village to village. We need to be careful not to guess that the local people want clean water and their wastewater treated. An educational program will hopefully make sure that this project will spread from one village to another.

ASSUMPTIONS: It is important that the money made from this project will cover the costs of the project. It has been found that the rain water in Southern Kalimantan is good enough from humans to drink without the need for any treatment. However, further research into the quality of the rainwater needs to be conducted. Also, it needs to be assessed if drinking rainwater is culturally acceptable.

METHODOLOGY: The two methods taken to overcome these issues are: using uncontaminated water sources and installing wastewater treatments.

To collect uncontaminated water we first must find an area that is good enough to gather rainwater. A study is currently being taken into the possibility of collecting rainwater from the roofs found in local villages. If this is possible, a simple roof gutter can be attached to collect rainwater and direct it to a storage tank.

If this does not work, building rainwater tanks to collect water can be used. As most houses are placed closely together, it may be possible to have 1 rainwater tank for every 1-4 houses. It may also be possible to connect household plumbing systems; this method would use the water collected from the rainwater tanks. It is thought that each tank will be placed above the ground and they would be large enough to store drinking water for the dry season.

It was also thought to use a single or two-stage septic tank. The local government also believes this may be a long term sustainable idea for the villagers. The design will have to consider river flooding along with other challenges such as maintenance.

CONCLUSIONS: The goal is to reduce the number of preventable deaths, importantly children, from diarrhoea and other waterborne diseases. This is done by removing the villager's exposure to the untreated wastewater and increasing the availability to an uncontaminated water source. This project has been considered extremely possible and unquestionably important for the sake of the people living in rural Southern Kalimantan.

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