

# Kamba Village, Sierra Leone:

## Pathways to a Better Life - Sustainable Design to Water and Roadways

### Team Genzyme

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**Abstract**  
A village in Sierra Leone finds itself at the mercy of nature all year round. The two major problems faced by the community are poor road conditions and a shortage of clean water. Our project confronts both of these issues simultaneously in order to improve the villagers' standard of living, educational opportunities and overall health. Redesigning the village's roadways by utilizing laterite-aggregate concrete in the paving process would allow for increased trade and access to services. By incorporating water collection canals and a purification system into this design our project ensures better opportunities for farming, prosperity and disease prevention.



### Project Origin

- The region of Sierra Leone experiences Rainy & Dry Seasons that are strikingly similar to the climate experienced by the ancient civilizations of the Yucatan Peninsula.
- Research into Ancient Mayan society revealed similar issues to the ones faced by present day Kamba.



- Mayan infrastructure included pitched roads that drained rain into a common centralized basin.



- Identifying ancient solutions led to our integrated design of Kamba's water and roadways.

### METHODOLOGY

#### Road Reconstruction

- Utilizing laterite-aggregate concrete to pave roads offers an abundant local building material that can later be recycled. Further sealant would provide a water resistant surface.
- Collection gutter system along either side of the roads would direct rainwater into a pitched drainage pipe.

#### Water Collection & Storage

- Collect water from canal system during Rainy season
- Use 12,000 gallon tank to store water. This amount of water will be used in Dry season which lasts for nearly 5 months
- Connect the tank with the "Slingshot" water purifier during the Dry Season

#### Water Purification

- Vapor compression distillation unit
- Works in conjunction with electric generator
- Takes advantage of almost any liquid
- Each produces 1kW of energy
- Uses a Sterling engine
- Has already been implemented in Bangladesh
- Runs on cow dung, or other combustibles
- A tube runs into the holding tank
- Distills up to a thousand liters of H-2O a day

### Project Impact

#### Social & Business

- Boost to the local economy
  - Increased competition
- Increase in bank activity
- Lowered transportation charges between villages



#### Health

- Decrease in child mortality
- Cleaner Water



- Aversion from diseases such as malaria and cholera.



### Kamba's Background

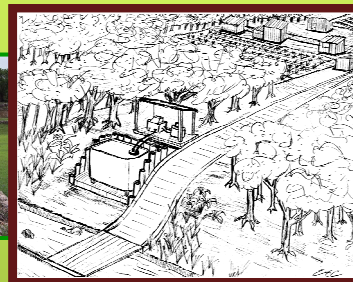
#### Water Concerns

- Dire water shortage, storage of water
  - 1 river and 1 well that dry up during Dry Season between the months of December and April
- Villagers wash, swim, launder and pass feces in only river. This easily leads to the contamination of the only water source.



#### Poor Roads

- Roads that are covered in dirt develop huge puddles during the Rainy Season making the village inaccessible
  - These stagnant water puddles are persistent breeding grounds for disease transferring mosquitoes



### Results and Recommendations

- That this project be integrated at a gradual pace during the dry season. In the early stages, only primary roads can be constructed.
- Use of local labor resources would prove ideal. It would create social services programs to boost economy and offer jobs.
- Local materials should be utilized to promote sustainability

#### Selected Bibliography

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