



Pinnacle Healthcare Consortium

**Strategic Implementation Plan:
Solid Waste Management and Economic Cycle
Nord Department of Haiti**

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Introduction

The reasons behind the persistent lack of infrastructure development in the Nord department of Haiti are complex and have no easy solutions. There are numerous socioeconomic, cultural and political hurdles to surmount in order to provide sustainable models of infrastructure development. Implementing simple systems for the provision of solid waste management infrastructure and sustainable clean water remains the cornerstone to improving the population health indices and by proxy its economic growth and development.

Pinnacle Healthcare Consortium (PHC) is familiar with the challenges faced in providing infrastructure improvement programs in developing countries. Our first step will be to construct a *Stakeholder Consultation Statement* in order to seek the appropriate balance of ownership between the government, private and public stakeholders for these waste management initiatives.



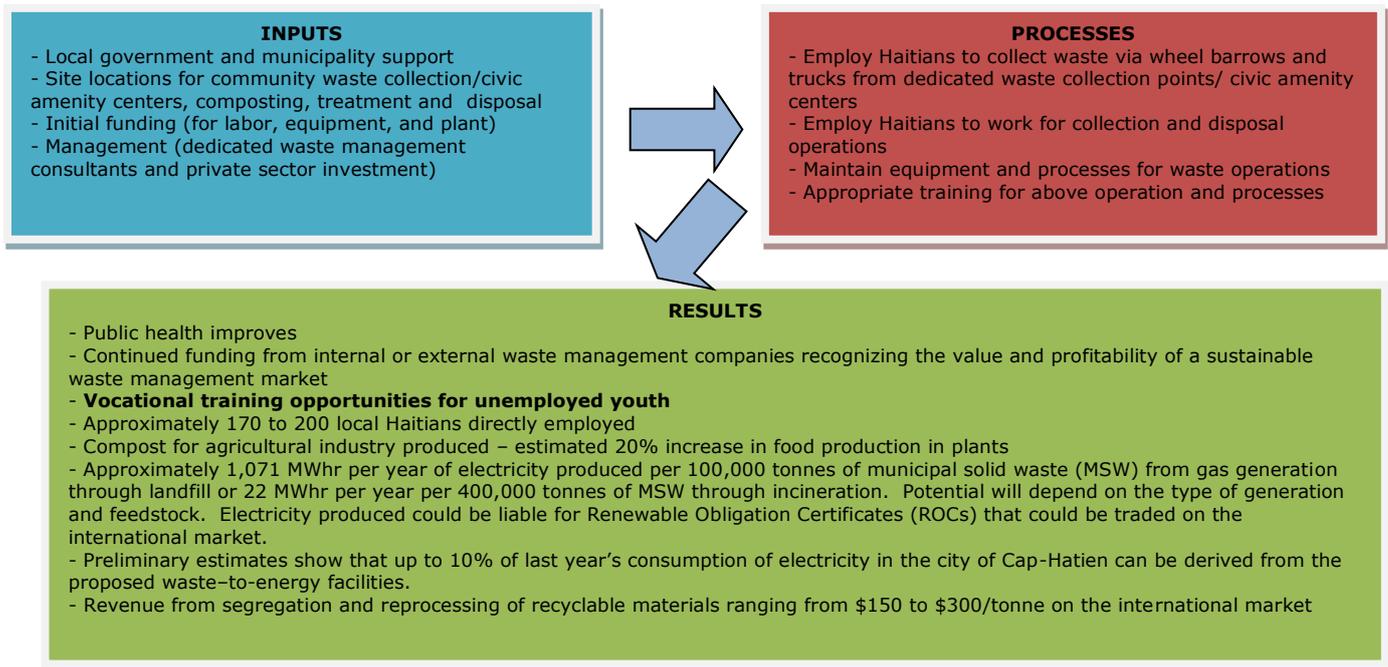
Children playing on trash in Cap-Haitien

The key objectives of this **waste management** initiative are:

1. Constructing a system that is economically viable and sustainable in the Haitian setting
 - a. Low technology, and thus operationally stable
 - b. Labor intensive, hence creating employment opportunities
2. Horizontal integration with the sustainable Clean Water and Bio-Waste Management initiative commissioned by the LifeQuest World Fund
3. Creating valuable by products from the operations to put back into the economy
 - a. Compost and fertilizer
 - b. Reprocessing recyclates for international export
 - c. Electricity generation
4. Piloting the system in Cap-Haitien with the potential for national roll out
 - a. Education and capacity building opportunities for local Haitians to ultimately manage the system



Requirements



Local Government Consultation

Local government consultation is key to development and implementation of any proposed strategy for the Nord region. We have linked in with numerous organizations to help with development and delivering of the proposed solution for the region and have found official accessible and willing to discuss our proposals with them.

Within our consortium we have local knowledge of the area and have developed a relationship and appreciation of the appropriate local government officials who will be consulted from conception to operation. We intend to undertake a *Stakeholder Consultation Statement* which will detail who and how each local stakeholder will be consulted. This will aid in the understanding and appreciation of proposal and improve the efficiency of the development process.

The development of undertaking our proposal will be a major process change to the existing system and therefore consultation will form part of an ongoing strategy of communication. An overarching public communications strategy will be outlined in the Stakeholder Consultation Statement and will have regard to the need to establish good public relations.

Vocational training for locals will be undertaken as part of other aspects of our proposed solution for the region. The training of staff for the provision of waste management will be undertaken as part of the public education exercise.



Waste Management and Economic Cycle



Solid Waste Management

The development of a sustainable solid waste management system for the region will be a challenge in logistics, education, consultation and implementation and will require a phased approach to ensure the goal of creating a sustainable operation for the people is achieved. Any focus on one of the following individual elements of the solid waste management for the region will greatly improve the sanitation and health of the people.

Our phased approach will consist of the following:

Phase 1 – Feasibility, site selection, stakeholder consultation and private sector commitment

Phase 2 – Consultation, development of a collection, recycling, treatment and disposal operations

Phase 3 – Revenue generation through the sale of recyclates, reprocessing and energy-from-waste development

Collection

Prior to the development of recovery, treatment and disposal facilities a system for waste a collection system needs to be established for the region.

Currently waste collection is ad-hoc with instruction being undertaken by the Minister of Health. We would seek to provide a proposal for a review and discussion with the Minister about the establishment of Community Disposal Points (or Civic Amenity Centers) where the public would come to dispose of household waste. Segregation of recyclables and distribution of products for re-use could also be undertaken at this location. For communities where this is impractical, collection rounds will be dispatched with suitable modes of transport including walking with wheelbarrows, bicycles or motorised vehicles. A review and consultation of appropriate collection, clean-up methods and rounds for the region will be undertaken as part of the Feasibility Study.



Transfer Stations/ Material Recovery Areas/ Civic Amenity Centers

The provision of Community Disposal Points (Civic Amenity Centers) would enable the public to bring their waste to a dedicated area so as it can be bulked for pick up and delivery to a larger Waste Transfer Stations. Upon receipt of the waste, waste will be sorted and segregated based on the characteristic of the waste to ensure organic, green waste, recyclable, hazardous fraction is extracted prior to being transported to the appropriate end-use disposal/treatment points. Where waste will be further treated or disposed of depending on the characteristic of the waste.

Recovery of Recyclables

Recovery of recyclables will be undertaken at Transfer Stations. Recyclables will be sorted based on the type of material such as metal, plastic, paper, cardboard, etc.

Once the waste management network is established and revenue is generated, development will be undertaken for establishing reprocessing facilities to process material into a useable product which can be used as either fuel or product for use by the local people and the region. Facilities such as these are capital intensive project and would require further discussions with the private sector for investment in addition to the generation of revenue through the through the sale of higher value recyclables on the international market.

Composting for Agriculture

Organic waste will be composted in open windrows to complete the natural carbon and nutrient cycles and turning the waste into a nutrient rich soil conditioner high in organic content and nutrients.

The windrows will be managed to ensure the natural composting process can take place. This natural process will be encouraged by ensuring the microbes have the correct environmental conditions. The material should be shredded to above 50mm and then placed in windrows above 4m high, moisture should be between 30 and 60 % (this can be monitored through a manual squeeze test) and the carbon (woody material) to nitrogen (grass or food) ratio should be managed to be between (30:70-70:30). When the microbes break down the waste they produce heat, it is this heat which kills pathogens (such as e-coli) and weed seeds. The heat within the pile should be maintained to be above 60°C for about 48 hours and turned twice during that period to ensure all the waste is sanitised by the naturally high temperatures. After much of the waste has been broken down the temperatures within the pile should start to decrease. The whole composting process should take about 7 weeks but can be longer to produce a more stable product.

Location and Equipment

The location of proposed sites will be determined during the Feasibility Study and should be rural. Organic material which has been bulked at the Transfer Stations will be brought to the composting sites for further litter picking and screening (to remove non-compostable material such as glass and plastics). A shredder will be used to shred the material prior to composting. After the composting process is complete a trommel screen may be used to screen any oversized (bulky chunks and contamination) and create a finer size compost 40mm is size suitable for agriculture. Farmers and locals will benefit from the end product, which can be used as a nutrient rich soil conditioner, high in Nitrogen and Phosphate, Potash and Magnesium and a rich source of organic matter which helps retain high moisture level within the soil.

Disposal

Disposal sites will be selected based on a number of criteria which include accessibility, geology and employment we would undertake this assessment within the scope of the Feasibility Study. Initially these sites would be used for the disposal of inert waste which has already had the organic, recyclable and hazardous fraction removed. A review of the hazardous waste element within the current waste stream will need to be undertaken as part of the site selection process.



The inert sites would then be used for the disposal of inert waste and would be sited based on a non-engineered design and geology of the region. Any hazardous waste will need to be disposed of in an appropriate facility. The extent of which will be determined once the waste is identified.

Waste Treatment Technologies

Additional waste treatment, reprocessing, and energy-from-waste facilities would be developed once the structure of the above waste management systems is in place. Generation of revenue and private sector investment will be required for further capital investment into the waste management infrastructure.

Financial Information

A detailed breakdown of expected expenditure for Waste Management will follow an in depth on-the-ground analysis by our waste management consultants in May 2011. For now they have provided scalable budget estimates based on their previous experience providing waste management solutions in developing countries.

Phase	Operational Activity	Expected costs (\$)
Phase 1	Feasibility, site selection, stakeholder consultation and private sector commitment	2,000,000
Phase 2	Consultation, development of a collection, recycling, treatment and disposal operations	10,000,000
Phase 3	Operations to enable revenue generation of products, reprocessing and energy-from-waste development	20,000,000
Total		\$32,000,000

Conclusion

This strategic implementation summary will deliver a final system that is efficient, economical, simple, and operationally sustainable. All our waste management activity will be horizontally integrated with the sustainable Clean Water and Bio-Waste Management initiative commissioned by the LifeQuest World Fund. Further work needs to be undertaken as part of a Feasibility Study to determine the extent of each of the above operations coming on-line. As part of this work collection of data, investigation and assessment is required and will be provided by our technical experts.

These infrastructure changing programs will usher improved health outcomes, essential by product for the agricultural trade, local employment opportunities and build a solid framework for an income generating recycling facility and creation of a sustainable waste management system for the region. Opportunities for the private sector will continue through commitment from operators (such as Balfour Beatty, Suez, Vivendi as well as US based companies), technology, and industrial plant providers.

