

COMPOSTING IN BLUEFIELDS

An assessment of current practices, market, and sustainability potential in Bluefields, Nicaragua

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BACKGROUND

The community of Bluefields, Nicaragua is developing a municipal waste plan to facilitate a more efficient system for processing both organic and inorganic garbage and incentivize opportunities for economic development. One of the keystones of this initiative is the creation of a sanitary landfill and adjoining recycling/composting facility. Primary investment for this project, which will cover the capital costs of implementation, comes from the Danish embassy; however, these funds are only secured for the next year. The mayor has, therefore, enlisted the help of MIT to establish a sustainable and self-sufficient enterprise to manage the city's organic waste.

When organic materials decompose in an anaerobic environment, as is generated under landfill conditions, they emit methane, a potent greenhouse gas. By diverting such waste, Bluefields has an opportunity to reduce atmospheric pollutants and generate income through the sale of rich resources including compost, worm castings and plants.

Since 2008, three women – Maricela Garzón, Alba Luz, and Felipa Romero – have been working for the municipality to process waste from the market and create compost through a series of small windrows. They are paid by the city on a biweekly basis as part-time employees regardless the amount of compost they produce. The finished product is sold out of the mayor's office, and current demand accounts for about half of what is generated. Given the surplus of unsold compost, the city is concerned that without continued subsidization there will no way to continue the project once Danish support terminates.

At the city's suggestion, our team began by considering the feasibility of creating an export market for the Bluefields compost. We quickly realized that such a goal could only be addressed after a substantial amount of work was completed on the local level; our primary areas of concern were production, product diversification, and marketing.

Working with four students from the Bluefields Indian and Caribbean University (BICU), we conducted meetings with several local non-profit organizations including Fundación para la Autonomía y el Desarrollo de la Costa Atlántica de Nicaragua (FADCANIC), Fundación Nicaragüense Cosecha Sostenible (FUNCOS), and the Black Farmers Association. We also spoke with a representative from the mayor's office, Gerardo Brava, on multiple occasions, as well as the Ministry of Education (MINED) to discuss and clarify the city's goals for composting.

ASSESSMENT

Through our research and conversations with community members and local agricultural experts, we generated a list of concerns to address in our proposal for sustainable enterprise opportunities from organic waste. Each is described briefly below.

1. Quality and Process Standardization

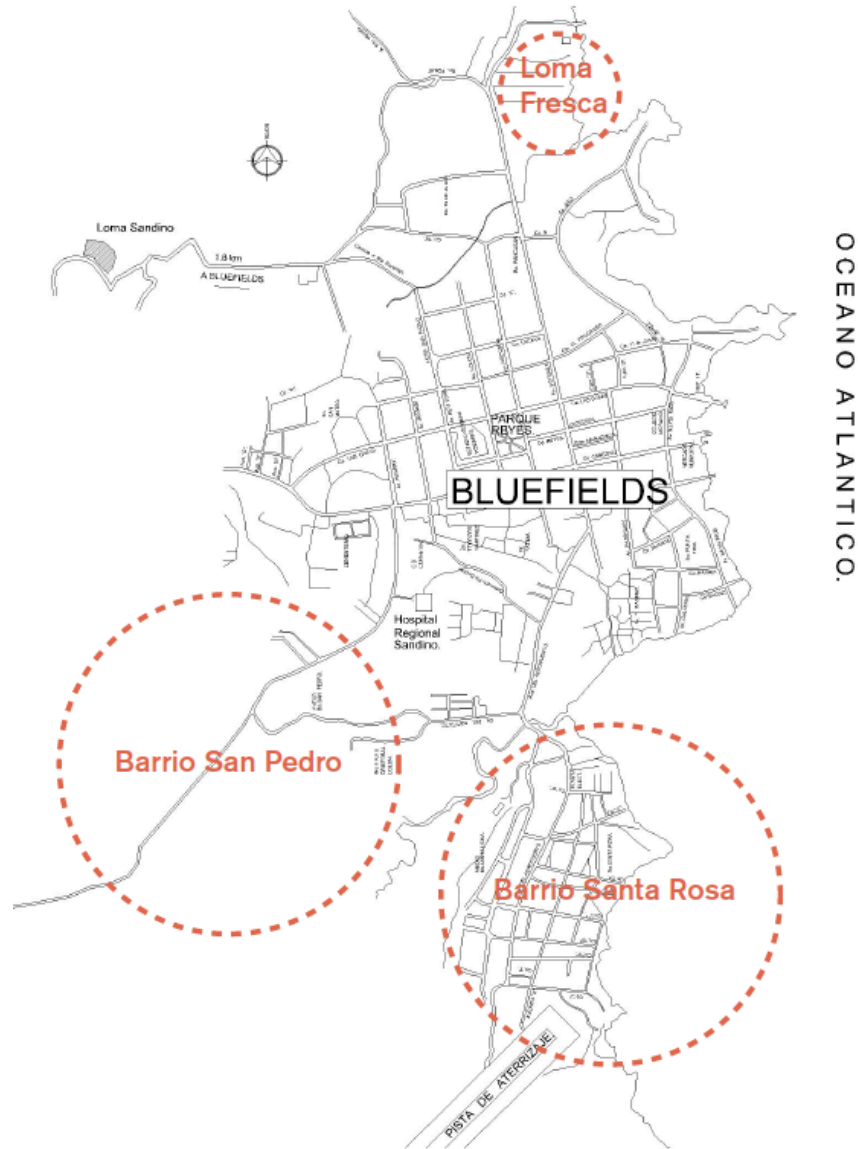
The composting collective does not conduct regular testing on the nutrient content of their product, nor does it monitor temperature, moisture content or pathogens. There is therefore no measure of quality or continuity from batch to batch. In addition, because their product contains pieces of plastic bags, rocks and other contaminants, the women are drying the finished compost so they can sift it. This practice reduces quality and eliminates many of the beneficial bacteria.

2. Access to Resources

The women at the composting collective are currently processing up to 10% of the city's organic waste. Due to the fact that there is not a great demand for compost in Bluefields, there is no incentive for the city to ensure access to the waste; municipal collectors often comingle food scraps with landfill refuse rather than separating it for processing. As a result, the composters often do not have sufficient resources to make compost on a continual basis. They work with limited tools and materials and have few avenues through which to voice their concerns about process and procedure.

3. Market Potential

Two of the limiting factors in the establishment of a local market for Bluefields' compost are a lack of space and the loss of the home gardening culture that used to be pervasive among community members. There are, however, certain neighborhoods (highlighted on the map below) where pilot programs might prove successful given due to greater economic resources and more open space on patios and surrounding property.



One of the main challenges in fostering a market will be the educational component. As there are few residents who currently grown their own plants and vegetables, it will take considerable effort to revitalize the concept of the home garden.

4. Motivation and Sustainability

The composters are concerned about the microenterprise opportunities for their product because of limited sales. Without continued subsidization (and the security that comes from their salaried positions), they are unsure whether they will be able to establish a self-sufficient business model to support their efforts. There is still a great deal of coordination that needs to take place between the women, the municipality, local non-governmental organizations and the broader community. Without an

integrated and comprehensive approach to organic waste management in Bluefields, it is unlikely that such a program could continue in the absence of financial supplementation from an outside entity. This was a primary consideration in our recommendations, which highlight the importance of creating a network to facilitate the generation of a sustainable business model.

RECOMMENDATIONS

In order to support the composters and better serve community interest, we recommend a phased approach to creating a sustainable system for organic waste management. We believe that, due to the multiple stakeholders to be considered in this process, it is necessary to hire two or three full time coordinators to oversee the implementation of this plan. The BICU students with whom we have worked have expressed interest in these positions, as they are familiar with the project and have the technical expertise required. [For reference, we have included their qualifications at the conclusion of this document.]

Our recommendations are comprised of the following phases:

PHASE I: Create a sustainable process for income generation from organic waste

To create demand, the compost needs to be of high quality and consumers need to be assured of its utility. We recommend setting up a regular testing schedule for nutrient content, as well as for pathogens and other contaminants. We also recommend formalizing the composting process by monitoring moisture content, temperature, odor, color, consistency and other factors. This regulation will better ensure a consistently high quality product for users. In addition, there needs to be a guarantee that organic waste will be delivered to the dumpsite every day from the collection route.

Diversifying its use through vermiculture and nurseries could foster greater demand for organic waste. We recommend creating test pilots for each of these enterprises, to be administered by new program coordinators in partnership with the composters. Vermiculture is a way of composting using earthworms to speed up the process, and worm castings provide rich humus that is a powerful fertilizer. The composters could also be trained in growing ornamental plants, vegetables, or nursery trees to sell for profit.

As the ultimate goal is the most efficient allocation of the green waste, we suggest that it be allocated in accordance with the demand for each finished product mentioned above. If there is excess green waste, it could also be fed to the slaughterhouse biodigester until the businesses expand. We have suggested this allocation to be able to accept all of the green waste while avoiding overproduction of compost or any other finished product.

PHASE II: Create a local market for the compost

The second phase consists of creating a local market in Bluefields for the compost by incentivizing the community to utilize and purchase the compost, vermiculture and plants. This begins with education. As a part of the larger educational campaign, we suggest having a section devoted to compost and organic waste. The educational campaign should consist of door-to-door visits, radio announcements, and street announcements. Through churches and schools, information about the benefits of compost could also be disseminated. The most important component, however, is the individual education about how vital the sorting of organic waste is to compost quality.

Included in this phase is marketing the compost: brand, tags, and resizing. Through support from FADCANIC, the compost could be sold in smaller packages under a unique brand name and a tag containing information about the nutrient content of the compost.

Our team also recommends promoting demonstration plots, where different plants would be grown using compost in order to confirm to the public that the compost is good for agriculture. Through our conversations with several institutions, we believe that FADCANIC, FUNCOS, and the Black Farmers Association would be willing to assist with demonstration plots. To accompany these demonstrations, we suggest distributing low cost compost and/or plants to advertise the products. This would also create opportunities for churches and schools to be involved with compost and agricultural promotion.

In collaboration with local experts, we have identified three areas in Bluefields as potential regions to unroll pilot programs for urban cultivation: Barrio Santa Rosa, Barrio San Pedro, and Loma Fresca. These communities provide a viable market for both compost and ornamental plants, and possibly small-scale cultivation of vegetables, due to the fact that there is adequate space and sufficient resources.

The compost could be sold at city hall, as well as at farmer's markets hosted by FADCANIC, with potential expansion opportunities based on the success of the local market.

PHASE III: Expand the compost market to a national level

In the third phase, Bluefields would analyze the potential for expanding the market to the national level. Export costs are too high for immediate exporting of the compost, but after strengthening the local market the city could assess the plausibility of expansion. Based on local and regional success of selling the compost (and other products), we suggest utilizing feedback from the pilot programs to conduct a cost and benefits analysis.

In order for the compost to be competitive at the national level, we also suggest formalizing and patenting a brand for the compost. An analysis of potential export markets will also have to be conducted.