

Biowaste separate collection in São Tomé and Príncipe, West Africa

J. M. Vaz^{1*}, J. Silva Ferreira², W. Trovoada², D. Stock²

¹ECOGESTUS Lda, Waste Management Consulting, 3080 328 Figueira da Foz Portugal, joao.vaz@ecogestus.com

²UCCLA – União das Cidades Capitais Luso-Africanas Asiáticas e Americanas, Rua São bento, 640, Lisboa, Portugal

³ Câmara Distrital de Água Grande, São Tomé, São Tomé e Príncipe

Keywords: biowaste, municipal solid waste (MSW), São Tomé

Presenting author email: joao.vaz@ecogestus.com

São Tomé and Príncipe islands (pop. 178 739), located in the Gulf of Guinea, West Africa, face acute waste management problems, lacking the means to collect and treat it adequately. Donor countries and agencies (UNDP, EU, AECID, IPAD, etc.) have been supporting waste management since 2005, with limited success. Most districts fail to collect waste, thus non-biodegradable material is accumulating in populated areas. However, Municipal Solid Waste (MSW) in São Tomé e Príncipe is starting to get momentum and to work at a minimum level, with organized collection and treatment. An MSW generation estimate, considering a domestic solid waste capitation of 0,35 kg per inhabitant per day, based on PAGIRSU – National Action Plan for Waste Management 2011-2016, suggesting a 16 500 tons yearly biowaste production.

Since 2009 UCCLA, with the support of European Union (EU) and Portugal as main donors, has been implementing infrastructures and providing know-how in different areas of waste management. In a first approach a field waste characterization campaign took place. This knowledge led to fix a value around 72% of all waste produced in São Tomé (capital, pop. 78.000) being biowaste, UCCLA has decided with the Local Authorities to invest in a small scale Composting Treatment Plant, named *Estação de Tratamento de Resíduos por Compostagem* (ETRC).

The ETRC has a planned capacity of 350 to 500 tons a year, with an estimated compost output of 50 tons. The total investment amounted to around 30 000 euro. This *de facto* Municipal Waste Plant started working in July 2013 within a training pilot program, involving local environmental technicians and farmers and also contributions from external experts on waste composting and biowaste collection.

The separately-collected biowaste has different sources: garden and green urban waste; municipal market waste and commerce (supermarkets, canteens and restaurants). Collection is carried by the municipality, using old vehicles and unmotivated workers, within São Tomé's low salaries and workforce lack of discipline. Moreover, separate biowaste collection is seen by Local Authorities as not a source of income and a way to reduce costs. UCCLA provided a specific study on how to increase biowaste profitability, hence detailing which steps are necessary to bring compost at the right commercial price to the market.

Separate biowaste collection system from specific producers such as canteens, restaurants, vegetable markets and other food services is a novelty in this part of the world. And, generally, in São Tomé, municipalities' willingness to implement biowaste collection systems is still low. However, recent developments and ETRC success in transforming biowaste into compost have changed the traditional prospects. Additionally, in order to overcome this limitation it is necessary to improve waste management within municipal entities, optimizing means and using resources (donors' money and equipment) in a more sustainable *modus*. Municipalities self-financing, allowing them to make an income from biowaste collection and treatment, is still under study.

The present work studies new chances in small West Africa countries, such as São Tomé e Príncipe, to overcome the described difficulties and to improve biowaste collection and treatment.

The work was conducted in close cooperation with Água Grande Municipality and the methodology consisted in identifying biowaste producers willing to participate; required means to collect waste and how to inform stakeholders; type of bins and other equipment; financial costs and how to achieve a breakeven considering the complete biowaste lifecycle; collection circuit for these biowaste; further investment and operation costs estimated and compared with the current collection of other types of waste.



Figure 1 – Biowaste Management Plant in São Tomé (ETRC)



Figure 2 – Biowaste separate collection in São Tomé