

## **ABSTRACT**

The Charcoal Energy Sector in Jamaica  
and  
Some Associated Environmental Conditions.

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The impacts of harvesting operations for charcoal production were assessed by conducting vegetation, soil and micro-climatic analyses on both harvested and unharvested sites in three areas of study. Harvesting operations impacted significantly on the vegetation structure of plant communities by depleting the adult population, thus modifying the age-class distribution of the individuals within the community. In many cases, plant communities recovered over a period of time, determined primarily by the nature of the species present as well as the degree of human interference. The impacts of harvesting operations on the soil were minimized by simple soil management techniques employed by charcoal producers which involved the replacement of plant foliage on the soil. This resulted in a general increase in water and organic matter content as well as nutrients such as potassium and nitrates especially in areas consisting of nitrogen-fixing species.

The conversion of biomass to charcoal energy involves the carbonization of woody materials at high temperatures in earthen kilns. The impact of this process on the environment was assessed by collecting and analysing atmospheric and soil samples from charcoal production sites in the study areas. Significant impacts were reflected in soil properties such as the soil pH, water-holding capacity, texture and nutrient content. The most detrimental impacts were associated with soil water properties, for instance, the reduction in percolation rates and water retentivity as well as the alteration of soil aggregates which enhances soil erosion. Nutrient losses were counterbalanced by the addition of ash to the soil during the carbonization process which returned potassium to the soil and inputs of rain which facilitates the breakdown of charcoal pellets to increase the organic matter content of the soil.

The emissions from charcoal kilns have less impact on the environment due to the low concentrations of the dangerous gases nitrogen and sulphur dioxide emitted (between 0 ppm and 0.335ppm). Concentrations of carbon monoxide, as much as 820 ppm, emitted from these kilns are potentially harmful to charcoal producers but poses no threat to the environment. A better understanding of the magnitude of these environmental impacts will enhance the management of the emerging charcoal industry as well as accelerate the efforts to find adequate solutions for the problems likely to be encountered.

Information regarding the charcoal sector in Jamaica was obtained from interviews conducted in the selected study areas. Interviews conducted in the selected study areas revealed that the production of charcoal provides full or part-time employment for a relatively large percentage of the residents in these communities in rural Jamaica. The bulk of the charcoal produced is consumed by residents in urban Jamaica especially in Kingston and St Andrew and this is facilitated by a number of small scale urban entrepreneurs who distribute and retail charcoal in urban markets. These activities define the existing charcoal energy sector which has three major components :- the production, trade and consumption of charcoal.

The best option for the alleviation of the environmental degradation perpetuated by charcoal production is the regulation and subsequent development of the existing charcoal sector by generating, on a sustainable basis, adequate raw material and improving the present conversion process for greater efficiency in carbonization.