Climate Resilience for Bay Oil

A Minor Field Study in the Commonwealth of Dominica, by Moa Rosén

Here follows a popular science summary of the master thesis *Climate Resilience for Bay Oil*. The thesis was written 2019/2020 at the Department of Technology, and accredited as a master thesis within Environmental and Energy Systems Studies (FMIM01) at LTH. The study was a Minor Field Study sponsored by Sida, and conducted in the Commonwealth of Dominica together with the Climate Resilience Execution Agency for Dominica.

Although the evidences for global warming and climate change being caused by human activities are becoming increasingly convincing, the uncertainties regarding effects and consequences of a warmer world are still causing a divided debate on what preventive actions that are necessary. Extreme weather events and catastrophes may sound very distant, but what happens when disaster knocks on your door? The Commonwealth of Dominica is a small island nation located in the Lesser Antilles of the Caribbean, one of the most exposed areas in the world to natural disasters, especially hurricanes. A few days after hurricane Maria made landfall in Dominica in September 2017 and caused damages of about 226% of annual GDP, the Prime Minister of the Commonwealth of Dominica declared the country to be at the front line in the war against climate change.

The intensity and frequency of hurricanes hitting the small island nation are increasing, and inhibits the economic development of the country and the region. With a vision to set an example and become the first climate resilient country in the world, the Climate Resilience Execution Agency for Dominica, CREAD, was established to lead and coordinate the reconstruction after hurricane Maria. CREAD also focus on achieving a sustainable economy, taking leverage unique assets and natural resources is essential to finance the resilience development.

Bay oil, see figure text for details, was identified by CREAD as one of these unique and important assets with a history of up to 85% of global market share originating from Dominica. Following a dwindling production during the last decade due to several natural occurrents, the aim of this report was to make an assessment of the current situation for bay oil production in Dominica. This included identifying factors affecting the industry historically and currently, as well as conducting an estimation for future production capacity.

There has been several events in the recent decade which has contributed to a decrease. Starting with the infestation of the bay tree disease Guava Rust in 2008, productivity decreased with about 30%. In 2015, tropical storm Erika destroyed the only industrial distillery on the island along with about nine artisanal distilleries and landslides damaging bay fields. In 2017, hurricane Maria did not only contribute to a loss of bay trees and destroy or damage all the remaining 20-40 artisanal distilleries, the overall damage to the country forced farmers to focus on their main source of income, resulting in abandonment of bay fields and distillery ruins.

Following a lack of supply, the increased demand for bay oil has increased the value from US$ 68/kg in 2014 to current values of up to US$ 2,338/kg, although only US$ 98/kg reach the farmers. Although it is unknown if this is a sustainable price in the long term, this presents a unique opportunity to increase the income for Dominican bay oil farmers, which is important according to farmers.

It was found that the industry has started to rebound with between 14-24 artisanal distilleries now in operation. The distilleries need to be used efficiently to increase bay oil production. Although bay trees are sturdy and survived well, propagation is needed to replace the lost bay fields. The industry also need modernisation to attract new farmers to produce bay oil, which could be achieved with the construction of an industrial distillery, facilitated transport and reconstruction of road network, automation in the harvest and field maintenance.

Bay oil derived from the tree Pimenta racemosa is one of about 70 essential oils found on the global market. Differentiated from vegetable or petroleum oils, essential oils are derived from steam distillation of plant parts and usually consists of several different aromatic compounds such as phenols and terpenes. Essential oils are commonly known for their scent and are used in perfumes, cosmetics and other toiletry products, they are also popular as food additives, and for pharmaceutical and aromatherapy applications.