Champion of the Environment Scholarship Essay

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Executive Summary

While the 300kg/person by 2030 target set forth by the Nova Scotia government is no small feat, that does not mean it is not possible. Solutions do exist and incentives can be found, the only thing is they must be implemented by not only the government but the public as a whole as well. One such solution is biochar. An organic charcoal with carbon sequestration properties, biochar is one way to convert organic matter into something that may be reused in numerous other industries with countless other uses. From the research being done on biochar, it is showing to be one such solution that may help in more ways than we can possibly understand right now. Looking away from biochar, there are multiple other solutions that are practiced both in our own backyard and around the world. Solutions that are not only reusable bags, but reusable containers for spices to soaps, swap shops where nothing is wasted, better sorting of the precious materials we think so little of, more incentives for shops doing their best each and everyday with their waste management, and cracking down harder on companies that do not follow these waste management rules properly. Keep in mind, for these solutions to truly have an effect, there must be some government cooperation. Better education, resources, and outreach are crucial to tackling the problem and making change. From the community to schools, the opportunity to do better is there. Policies to be implemented are not an exception. Highlights amongst them must include reducing the use of unnecessary materials, monetary incentives, and policies governing all these aspects of waste management.

Approximately 1000 tons of snow crab waste is shipped annually from Louisbourg Seafoods Limited in Cape Breton to a landfill in Guysborough County, Nova Scotia (Armstrong, n.d.). The parts of the crab body that are most desirable are the legs, leaving the last third of the body to be considered waste. The transport of this waste is expensive and creates a significant carbon footprint as a result of the large quantity of CO_2 emitted during the combustion of fossil fuels such as diesel fuel. Furthermore, the decomposition of these crab bodies would also contribute to CO_2 emissions. Louisbourg Seafoods Limited is in search of sustainable ways to reuse and recycle this crab waste. One possible solution has been to convert the crab bodies into an organic charcoal called biochar at the local university (Armstrong, n.d.).

Bbiochar stored in soils decomposes at a very slow rate, with 97% remaining in the soil for at least one hundred years. The slow decomposition of biochar can have links to the sequestration of carbon in biochar and soil, and the ability of biochar to reduce the release of atmospheric carbon connected to climate change (Wang et al., 2016). To emphasize the need to reduce carbon emissions, a report conducted by Jackson et al. (2019), found that CO_2 emissions relating to human activity had increased by 1.4% in 2017 and approximately 2.1% in 2018. These results were seen in 2019 with global CO_2 emissions increasing by 0.9% that year (Olivier & Peters, 2020). When biomass is converted to biochar, approximately 50% of the primary carbon is stored in the biochar. This is assessed alongside the amount of carbon remaining in organic matter after burning (about 3%) and after 5-10 years of decomposition (less than 10%-20%; Lehmann, Gaunt, & Rondon, 2006). With pyrolysis, the decay and release of CO_2 into the atmosphere is prevented when biomass is converted to biochar. A global application of sustainably produced biochar could counter 12% of carbon equivalent emissions produced by humans (Woolf, Amonette, Street-Perrott, Lehmann, & Joseph, 2010).

Along with the benefits of biochar to reduce waste and counter carbon emissions, one example of how biochar has been used was evidenced in a study done by Biederman and Harpole (2012) that determined in most applications of biochar as a soil amendment, crop yield and pH levels were increased along with other soil properties when compared to the performance of soils without biochar. Moreover, the composition of biochar depends on the composition of the biomass from which it was derived as well as the environment in which it was produced, meaning any form of biomass may turned to biochar and different materials will yield biochar with different properties (Ippolito, Spokas, Novak, Lentz, & Cantrell, 2015). The research and use of biochar are continuing to grow all over the world, a promising endeavor for waste reduction.

A current zero waste company in Mabou, Cape Breton presents a great idea for waste management. Store owner Karen Allen of Brook Village Grocery uses a zero-waste refill station. This system involves customers using their own reusable containers to fill up on household products like soaps and spices (Latimer, 2022). This severely limits the amount of plastic waste being generated and encourages others to live a zero waste lifestyle. This fairly easy and simple process of switching over to reusable materials is one that we are starting to see within Nova Scotia and Canada but is one that has yet to take a truly large effect.

In terms of waste management solutions around the world, most solutions involve cities using more drastic means to reduce the amount of waste they are producing. A good example of the government taking initiative against the waste problem is the Belgian city of Flanders. In addition to basic disposal means, the region provides subsidies to second-hand shops and makes it mandatory for producers and retailers to properly dispose of hard-to-recycle items such as electronics and oils. Another rural community in Kamikatsu, Japan has implemented impressive

ways to control its waste. The residents of the village actually sort their garbage into 45 different categories before washing what they can and sending it to a central recycling station. The village also works to reduce waste by housing a swap shop where people can leave unneeded items and take what they do need for free (ZeroWaste, 2021).

These are all methods that may be helpful in reducing waste in Nova Scotia. The idea of communities starting to have more of their own swap shops or better encouraging similar practices is certainly attainable. The idea of wasting nothing but also getting what you need for free is a great incentive for the majority of the population. Also, having more reusable materials would honestly go a very long way, and it is something that is very easy for individuals to do when shopping.

In terms of schools, it is well known that they consistently present a magnified representation of the problems we face in terms of waste management. Children are not always mature enough to know (or care) how to properly dispose of their garbage, however, a big portion of the problem simply comes down to a lack of knowledge. Nowhere in school are there classes about the impacts of climate change, the environmental issues we face and soon will face, how to dispose of and reuse materials, or how to research and develop solutions. This just goes to show how necessary education is. If these problems are present in schools, chances are they are going to carry over into the everyday world as well. Ensuring children know proper practices and follow them from a young age will help ensure the 300kg target is reached. On another note, continuing education via digital means would also encourage a less waste attitude. The use of technology needs to be regulated, such as for young children learning to write, but in most other cases technology is a viable means to learn that drastically reduces the amount of paper and other materials being used in schools.

It is no surprise the 300kg target is not one that can be attained without the help of government initiatives. In fact, there are numerous policies and plans the government could enact which could set forth a better response and more initiative to reach this goal. The most noteworthy suggestions from a report by Davidson & Owen (n.d.) include implementing policies that better govern and reduce the amount of material being used, especially where digital options are available. This could include decreased production of phone books, less plastic packaging on commercial items, and double-sided paper policy for public printing (at libraries for example). In terms of monetary policies, systems that may effectively work are those of user-pays and providing financial incentives for reducing waste. Moreover, ensuring companies provide better options for buying items in bulk with less packaging and perhaps even discounts for these items may help in reducing the amount of waste generated per person. Enforcing contracts or policies upon businesses to manage and reduce their own waste and the sorting of it may also be beneficial. The last piece to the puzzle would of course be better education and outreach. More education in schools would go a long way as there is ample opportunity to teach responsible waste management (in health classes for example) in public elementary and middle schools. If students have the opportunity to learn about healthy living and artistic techniques, then it only makes sense they have the opportunity to learn about both environmental issues and solutions. In addition, better communication of this disposal target, proper waste management, other waste disposal and diversion solutions, and the importance of these attitudes would significantly aid in the fight to reduce waste. Traditional outreach solutions include radio, television, and newspaper while a modern solution would be social media and especially social media advertisements.

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