Bamboo:

Savior of the Planet

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Outline

I. Introduction
   A. A building made of bamboo can remove 40 tonnes or more CO2 from the air over the span of 100 years.
   B. Bamboo has many of the fine qualities that contribute to the environment and how bamboo can ultimately be a cure for our overabundance of CO2 in the air.
   C. Our planet has been in a major environmental crisis for quite some time. We utilize renewable resources like wind and solar but refuse to fully acknowledge this one resource that could give us cleaner air and water.

II. Body
   A. Bamboo
      1. Bamboo is a woody, grassy plant that has no bark and has many species.
         a. Species of bamboo
         b. Classifications of bamboo
      2. Bamboo is a plant grown in different countries of Asia and all over the world.
   B. Water purification
      1. Waterborne illnesses
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   C. Carbon sequestration
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III. Conclusion
   A. Bamboo can give us cleaner air and water and ultimately help save the planet.
   B. One way to stop killing our planet is to use bamboo for the good resource it is.

Imagine you're walking along and notice this peculiar building that looks different from all the others. When inspecting the building, you ask the owner why it is that this building looks different from all the others. The owner begins to tell you that this building is made of bamboo and because of this it will remove 40 tonnes of CO2 from the air over 100-year span. Bamboo has many fine qualities that contribute to a better environment and ultimately make it a cure for the overabundance of CO2. The other good quality is that it can be processed into charcoal, which can act as a water-purification element. Our planet has been in a major environmental crisis for quite some time. Renewable resources are abundant, but though we utilize resources like wind and solar power, we fail to acknowledge that we have one resource, bamboo, that could give us cleaner air and water, which in turn could ultimately turn back the fate of our planet.

Bamboo is a woody, grassy plant that has no bark. It is mainly grown in the in East and Southeast Asia. This plant has many species, such as timber-size bamboo, which is native to lower elevations of China and Japan; mid-size runners, which are located farther north in China and Japan; and canes, which are native to the mountainous regions of China, Nepal, and Tibet. Bamboo is classified in the plantae kingdom, class Lopsidia, order Poales, and family Poaceae (Roberts, 2013). In conclusion, bamboo is a plant that is grown on a global scale but has been untapped for centuries.

Today we have basic human needs like food and water. Water is a basic human need that needs to be clean for us to drink and cook with. Water that is not purified can infect people with gastrointestinal illnesses. This is due to the fact that all water comes from the ground and has to be processed through a filtration system. The Safe Drinking Water Act and

Groundwater Mandate requires that all municipal ground and surface water is monitored and kept safe. A good number of waterborne illnesses are caused by regions that receive heavy rainfall with minimal purification efforts (Uejio et al., 2014). The case study of one particular city in Southern Lebanon stresses how important having safe drinking water is a basic human right. World Health Organization and United Nations International Children's Fund say, "Waterborne diseases are a great burden on both public health and the economy; globally four billion cases of diarrhea occur annually, of which 2.2 million are fatal" (qtd. In Massoud, Abady, Jurdi, & Nuwayhid, 2010, p.24). In Lebanon alone, 60% to70% of the water supply is contaminated; most of that is in the rural areas. The reason for this is that rapid population growth was not factored into the infrastructure design (Massoud, Abady, Jurdi, Nuwayhid, 2010). This problem with water contamination does not just affect people locally but also on a global scale. In retrospect, creating ways to obtain safe drinking is so crucial to our survival.

Bamboo is a woody plant that can be processed into iron-modified charcoal, which in turn can be used for water filtration. Our water tables have so many contaminants that have to be filtered and reduced to lower levels to obtain safe drinking water. The one element that is very widely prevalent in our water supply here and overseas is arsenic. Choong states, "Consumption of arsenic-contaminated drinking water can cause damage to skin as well as the organs of the respiratory, digestive, circulatory, neural, and renal systems" (qtd. In Liu, Ao, Xiong, Xiao, & Liu, 2007, p. 1033). Bamboo charcoal has a minimal effect on arsenic, but iron-modified charcoal has a significant effect on arsenic removal from water tables because of its absorption properties (XI Liu, Ao, Xiong, Xiao, Liu, 2007). Iron- modified bamboo charcoal can eventually be looked at a source for purifying water locally and abroad.

Bamboo has a specific quality that makes it so beneficial to the environment and when it is used in construction. Carbon sequestration is the process by which bamboo eats the CO2 from the atmosphere and stores it within the strands of bamboo to strengthen it and grow. If we are to maintain carbon sequestration in our soil, Lal states, "Though carbon emissions from agricultural activities contribute to a net increase in atmospheric CO2, carbon sequestration in agricultural soils, through the adoption of improved management practices, can mitigate this trend" (qtd. in Zhuang, Sun, Liu, Wong, Cao, 2011, pp.252-253). This can be achieved by mulch farming, integrated nutrient management, and crop rotation. The growth of any city depends on the ability to construct things. Construction companies for years have used wood for the construction of I-beams that are used in all the support spaces, where there is weight-bearing, whether it is a roof or floor. One inventor has discovered that wood is becoming harder to attain due to tighter environmental restrictions and that in a fire, the wood I-beams are the first to go. William McDonald has invented an I-beam made of bamboo that would change the support structure of buildings. McDonald states, "The use of bamboo culm as an I-beam component, without compromising the beneficial characteristics of a tubular cane, provides numerous advantages over wood including higher overall strength for the same volume of content, higher fire resistance, lower weight, and high durability and flexibility" (qtd. in "Patent Issued for Bamboo I-beams ," 2013, p.1). A bamboo building will take about 15 tonnes of CO2 out of the atmosphere for every 100 square feet of floor space (Nachiket, 2009, p. 1). In conclusion, when carbon sequestration is maintained, it can ultimately help remove CO2 from the atmosphere and mitigate climate change. This also holds true when bamboo is processed properly to be used for construction.

In looking at all the many benefits bamboo has, the main ones that stick out are that it can produce a whole new ecosystem, it brings us cleaner air, and lastly it provides a product that can be economically sound, like bamboo bicycles. Deep inside the Peruvian jungle, there is a species of bamboo that is grown and has provided a home for a whole new ecosystem. This in turn provides a food source to the many animals that live there like the Cebus monkey (Conover, 1994). The VIII World Bamboo Congress, which is comprised of 500 delegates from over 34 countries, convenes to express its concern about the environment. The main topic of discussion is bamboo and how it can curb CO2 emissions in the environment. David E. Sands stated, "Bamboo offers perhaps the quickest way to remove the amounts of carbon dioxide from the atmosphere" (qtd. in Nanchiket, 2009, p.1).

The economy and way of life can also be transformed by bamboo. David Ho project coordinator and Columbia scientist, has developed a bamboo bike, which he plans to introduce to the poor parts of Africa. This idea has a lot of benefits, such as that it is lightweight, cheap and easy to assemble. Modes of transportation are few and far between in that part of the world because of the lack of money and how expensive it is to import bikes from China. His goal is to set up two bike shops and a factory where villagers can come and use tools to learn to build these bikes, which in turn will improve the way of life of each African ("Bamboo Bikes," n.d.) Bamboo has many benefits that can even improve the quality of life for the poorest citizens by providing them vehicles that are economically sound and lightweight.

In conclusion, with every beneficial quality that bamboo has in giving us cleaner air, cleaner water, better constructed buildings, new ecosystems and in providing an economically sound product for a poor Africans, then why hasn't anyone picked up on this resource as of yet

in the United States? We as a nation need to realize we are in a major crisis when our planet is deteriorating because of excess CO2 emissions in the environment. This one resource could ultimately save the planet if we embrace and utilize its wonderful benefits before it is too late.

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