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Biofuel: An Ethical Burnout

In an attempt to develop more efficient natural renewable resources in the wake of an international crisis of nonrenewable resource depletion, the scientific community developed an alternative for liquid petroleum fuel: biofuel. Biofuel refers to liquid fuels derived from plants with primary uses in transportation and mitigation of the harmful climate-related effects of fossil fuels (Thompson 2012, 172). Sources for biofuel–also known as biomass–range from plant feedstocks such as maize or sugarcane to more innovative utilizations such as miscanthus, jatropha, or crop residues (Thompson 2012, 340). Although the idea of biofuel may seem new and innovative, it is a relatively old idea. In the 1930s, Henry Ford suggested using corn-ethanol to fuel his model T and in the 1940s Samuel Brody, the pioneer of animal bioenergetics, suggested biofuel should be the primary energy source after all petroleum resources have been exhausted. However, Brody also realized how converting all crop production to biofuel production could not meet the rate of petroleum-energy consumption (Brody 1945, 968). Therefore, despite its valuable potential in providing an alternative to nonrenewable petroleum resources, a transition to an increasing future dependence on biofuel creates unethical social, economic, and agro-environmental issues.

Some of the pressing issues of the biofuel industry are its unintended unethical social implications. Economic and agricultural stability have a significant impact on the social stability of communities worldwide. Biofuel, specifically, has been determined to be a major contributor to fluctuations in food prices. Amid economic recession in 2008, due to 50-200% increases in the price of key food commodities, 110 million people were driven into poverty with 44 million added to the undernourished. The World Bank and the IMF concluded that rising biofuel

production as well as its policies drove millions of people to be under the poverty line (Gomiero 2009, 414). Thus, increases in food prices had dramatic direct consequences for many poor people internationally, especially in developing countries where citizens spend most of their income on the staple foods. As a result, in the past few years, there have been rioting and demonstrations in many cities protesting the stark increases in the prices of staple foods used for biofuel.

Another consequence of converting cropland for biofuel production is the resulting malnutrition and loss of potential food sources worldwide. According to data from 2009, nearly 30 percent of humanity are suffering from one or more of the multiple forms of malnutrition. (Gomiero 2009, 412). Transforming cropland for the production of biomass in countries where the majority of people are suffering from malnutrition creates serious ethical issues in the survival and sustainability of the country and its people. Until there is a discovery of how to achieve efficient and ethical sustainability in the production life cycle of biofuel, an ethics of hunger persists in the process. The idea of the utilization of biomass as an energy resource conveys the impression that the implementation of biofuels will strengthen food entitlements especially for poor farmers and farm labor (Thompson 2012, 355). However, it is unlikely to be helpful without continued extensive efforts to advance production technologies in a way that can easily be implemented, beneficial, efficient, and provide assured sustainability.

Essential components to any growing business are the business' financial inputs and outputs. The business of expanding biofuel production to meet and replace the supply and demand of petroleum fuels is very ambitious as well as a risky investment. Based on current and projected ethanol consumption and estimates on domestic production capacity, large scale ethanol (biofuel) production would be required as well as improved bioenergy techniques and

technologies for future stability and efficiency worldwide (Walter 2008, 736). Numerous investments would have to be allocated into researching biofuel technologies and expansion of the biofuel industry in order for large scale ethanol production to be efficient, successful, and ethical.

Additionally, fluctuations and unpredictability in the price of inputs of corn and ethanol production systems and the value of its coproducts make the biofuel industry very unpredictable and thus undesirable (Kraatz 2013, 216). A very important consequence of an increasing dependence on biofuel production and utilization is simple economic supply and demand. According to projections from the USDA, corn produced for ethanol will continue to increase in the coming decade leading to an increased demand for corn internationally, and thus, higher prices and less corn available for export (Campiche 2009, 2). Evidently, the group expected to face the greatest setback from an increase in corn prices is the livestock feeding sector as they use 50 to 60 percent of U.S. corn (Westcott 2007, 12). Another significant issue that biofuel tries to tackle is overcoming foreign dependence on oil. However, it would take a great increase in ethanol production, and thus more funding, before it would begin to come close to stamping out the United States' need for foreign oil (Chamberlain 2009, 4). Before biofuel production and utilization can make a substantive effect on the U.S. and world economies, a great amount of funding must be injected into research of biofuel technologies.

However, even if biofuel was a safe investment and did not pose any unethical economic or social problems, new research has discovered that biofuel production expansion will have outweighing negative effects on the global climate. The idea of "carbon debt" explains how ethanol and biofuels will have an agro-environmental effect on the global ecology. Despite the idea that biofuels are recognized as a potential low-carbon energy source, biofuels ultimately

increase the overall global carbon emission (carbon debt) by clearing land to replace displaced food production and thus exacerbating preexisting environmental problems (Gomiero 2009, 419). Moreover, according to data collected of biomass life cycle assessments in Wisconsin, the net energy value calculated post-production only yielded minor energy return and surprisingly also displayed a higher average global warming potential when compared to gasoline production and use (Kraatz 2013, 216). In order for biofuel to become a viable option to substitute the petroleum-fuel industry, it must first prove to have limited effects on the global climate.

Another aspect aside from affecting the global climate is how the production of fuel from biomass creates problems for the environment and for the future of human civilization. An overlooked aspect of biofuel production is the environmental effects associated with the continued maintenance of biomass. Although there have not been many studies on water quality specifically, biofuel production is supposed to have a heavy impact on soil quality from nutrient leaching to eutrophication from agricultural upkeep (Sheehan 2009, 321). Additionally, in order to achieve sustainable energy for the future, there must be a common aim to expand resources and improve the quality of live for as many people as possible. This common aim must also be achieved while avoiding the never-ending cycle of solving problems with new technology solutions which produce new problems that need new technology solutions (Sheehan 2009, 319). Lastly, a crucial aspect of energy production efficiency is whether a resource can be classified as nonrenewable or renewable. In its most basic idea, biofuel should be defined as a renewable resource since biomass can be grown as long as there is land to support its growth. However, studies of ethanol production in China have revealed that the corn-ethanol process is not environmentally cost-effective taking into perspective the net exchange of energy between humans and the environment. Due to high electricity consumption in the industrial conversion

process, even without waste treatment processes, the whole biofuel production system yields a nonrenewable resource (Yang 2007, 2459). Therefore, biofuel production has been proven to have unethical effects on the environment and the future sustainability of energy production and agriculture internationally.

Although biofuel and other biomass production techniques promise a bright future for clean renewable energy, the process produces various unethical social, economic, and ecological problems. In order to create a biofuel production system that works to provide a symbiotic exchange between humans and the environment, there must be some agreement to the magnitude of change that must be accomplished before advancing the future of an efficient energy resource. Most importantly, greenhouse gas emissions from biofuel production must be dramatically reduced in the life-cycle of biomass plants as well as the cultivation and manufacturing of the fuel. Biofuel production should also not jeopardize food production and food prices as well as not cause any negative impact on soil and water bodies. Lastly, biofuels should have a positive impact on the region where they are produced, aiding its local population and economies, and furthermore, the world economy (Walter 2008, 746). Without these necessary proponents, biofuel production will continue in failing to achieve global success and will continue to falter in providing an ethical solution to the ever-growing demand for an efficient source of renewable energy until its ultimate burnout.

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