

This response was submitted to the consultation held by the Nuffield Council on Bioethics on *New approaches to biofuels* between December 2009 and March 2010. The views expressed are solely those of the respondent(s) and not those of the Council.

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QUESTIONS ANSWERED:

Question 1

ANSWER:

Biofuels are only useful as far as they achieve their goal of reducing GHG emissions in a economically and socially. To have reason to move toward a greater use of biofuels, they must not only generate real GHG emission savings, but produce more than would be saved if money were invested in alternative renewable technologies. While the cliché that there is no one "silver bullet" for climate change rings true, we have limited human and financial capital to invest in the problem and we must use what we have economically. Further, climate change has garnered public and political attention for a variety of reasons, but principally for the consequences it will have on human societies. Biofuels thus must not only address GHG emissions at a justifiable economic cost, but must also not generate more problems (e.g. food security, human rights abuses, etc) than they solve. As suggested in the background information for this consultation, the effectiveness and consequences of biofuels are largely unknown. Until these questions are answered, and I hope this consultation will generate some answers, it is impossible to say whether we should move toward greater use of biofuels. Biofuels have no intrinsic value in themselves, and the decision depends upon a currently unknown cost-benefit analysis.

Question 2

ANSWER:

The most important ethical questions raised by the prospect of future generation of biofuels relate to consequences for societies. The developing world's economic, governance, and human rights conditions make societies there particularly vulnerable. Climate change is of concern primarily for its potential to inflict human harm, and transferring harm from one group (i.e. those effected by climate change) to another (i.e. those effected by biofuels) would be unethical. Before we commit to biofuels, potential problems relating to food security, human rights of workers, health issues (possibly from agro pollution or burning of biofuels?), and other areas must be examined and resolved, be it through prevention, recompensation, or other means. Further, we know the potential consequences of climate change, and it would be unethical not to give such a danger the attention it deserves. This means we are not only obligated to focus on biofuels' potential knock-on effects, but also to analyze its potential opportunity costs vis-a-vis other technologies and solutions. Adopting biofuels at the expense of more effective or efficient mitigation approaches could engender serious climate and/or economic consequences for future generations, and anything short of doing our best to implement the best policies would be unethical.

Question 3

ANSWER:

Economic and political factors will be the most important in driving the development of biofuels. Politics (desire to mitigate climate change, energy security, others) will decide whether or not biofuels should be pursued, and economic incentives, as determined by legislation, will dictate the pace and cost of transition. Other factors that could come into play are 1) oil supplies (peak oil, growth in Asia, conflict in the Middle East, etc) and 2) alternative technologies, such as electric vehicles. As far as mitigating climate change, energy security, and economic development all lead toward the same goal, I don't think any concern should be given priority over another. What is most important is the result, not the reason for why we arrive at it. I believe that the biofuel and alternative possibilities are open enough that we can arrive at a solution that can work toward the advancement of all three policy concerns. At the very least, each is important and it is not worth seriously sacrificing the advancement of one concern in favor of another. Our democratic political process drives us even more toward striving for a solution that best advances each concern. Legislation may be scientifically based, but it remains above all political. If it

were possible to definitively label one concern as overriding it still may not be desirable to do so; advancing one concern at the expense of others could undercut political and public support. Politics is compromise, and it is preferable to have a semi-successful policy over no policy at all. On top of climate mitigation, energy independence, and economic development, biofuels should aim to address the health issues that arise from air particle pollution. While not the primary reason to switch from biofuels, we should take advantage of any transportation redesign to improve the system in as many areas as possible. Adding health improvements as one of the advantages of a switch to biofuels would also further increase necessary political and public support. Biofuels must also deliver sustainability. With gas, there are concerns over peak oil. I do not know much about agriculture, but I'd want to ask experts to make sure that crop yields would not decline over time due to intensive land use. Sustainable economic and environmental development are likewise important. We should not switch to a system that will need to be replaced in half a century's time.

Question 4

ANSWER:

Economic and political factors will be the most important in driving the development of biofuels. Politics (desire to mitigate climate change, energy security, others) will decide whether or not biofuels should be pursued, and economic incentives, as determined by legislation, will dictate the pace and cost of transition. Other factors that could come into play are 1) oil supplies (peak oil, growth in Asia, conflict in the Middle East, etc) and 2) alternative technologies, such as electric vehicles. As far as mitigating climate change, energy security, and economic development all lead toward the same goal, I don't think any concern should be given priority over another. What is most important is the result, not the reason for why we arrive at it. I believe that the biofuel and alternative possibilities are open enough that we can arrive at a solution that can work toward the advancement of all three policy concerns. At the very least, each is important and it is not worth seriously sacrificing the advancement of one concern in favor of another. Our democratic political process drives us even more toward striving for a solution that best advances each concern. Legislation may be scientifically based, but it remains above all political. If it were possible to definitively label one concern as overriding it still may not be desirable to do so; advancing one concern at the expense of others could undercut political and public support. Politics is compromise, and it is preferable to have a semi-successful policy over no policy at all. On top of climate mitigation, energy independence, and economic development, biofuels should aim to address: 1) Health issues that arise from air particle pollution. While not the primary reason to switch from biofuels, we should take advantage of any transportation redesign to improve the system in as many areas as possible. Adding health improvements as one of the advantages of a switch to biofuels would also further increase necessary political and public support. 2) Biofuels must also deliver sustainability. With gas, there are concerns over peak oil. I do not know much about agriculture, but I'd want to ask experts to make sure that crop yields would not decline over time due to intensive land use. Sustainable economic and environmental development are likewise important. We should not switch to a system that will need to be replaced in half a century's time. 3) Finally, biofuels should aim to reduce the money given to governments that are subversive to global order, stability, and security. By moving away from fossil fuels, we can reduce the revenue stream that keeps authoritarian governments in power. We can also reduce our reliance on oil supplies from the Middle East, and thus our military commitments in the region.

Question 5

ANSWER:

I am not familiar enough with the specific new and upcoming biofuel technologies to comment upon which will be the most successful in generating GHG emissions savings. The successful technology, however, will reduce GHG emissions throughout the entire fuel cycle, including land use, shipping, and fuel conversion. New biofuels should be encouraged through government regulations that adjust the market price on carbon (cap-and-trade or a carbon tax, preferably the latter), on gasoline, or both, to account for the negative externalities of their use. The climate change reasons not to encourage new biofuel approaches are 1) if our limited human and economic capital can be better invested in other climate mitigation strategies and 2) if the use of biofuels would have negative knock-on effects in other areas—

primarily human security (food security, human rights, economic development, etc), but also energy security, public health, and other areas that may be effected. Ignoring these knock-on effects would be unethical.

Question 6

ANSWER:

In terms of energy security, a steady supply of biofuels should be homegrown, readily producible by allies, or coming from a sufficiently varied number of countries that no one or small group of suppliers could endanger imports. It is also important that biofuels be easily storable, so nations can develop strategic reservers. The best way to switch from fossil fuels to biofuels is via a market price on carbon (or gasoline, or both) that corrects negative externalities. Government mandates may be ultimately work, but at an unnecessarily high cost. Power projection in the Middle East is the principle negative externality relating to energy security, but there are many others that relate to the consequences of climate change. Taking these externalities into account would strengthen the price signal and provide greater encouragement to transition toward biofuels. Thus linking energy security and climate change is an ideal way to encourage a transition to biofuels. The energy security reasons not to encourage new biofuel approaches are 1) if making the switch creates greater global stability issues, perhaps because oil exporting countries could view the energy security reasoning as hostile and 2) if the use of biofuels would have negative knock-on effects in other areas—primarily human security (food security, human rights, economic development, etc), but also energy security, public health, and other areas that may be effected. Ignoring these knock-on effects would be unethical.

Question 7

ANSWER:

The new approaches to biofuels that will be most successful in supporting economic development will be sustainable and applicable on a wide scale and in a variety of settings. The best way to switch from fossil fuels to biofuels is via a market price on carbon (or gasoline, or both). The climate change and energy security rationales make particularly strong cases for putting a market price on carbon, and thus linking development with these other two priorities would be an ideal way to encourage a transition to biofuels. In addition to a market price on carbon, we can encourage transitions to new biofuel technologies that also aid economic development by removing market distorting subsidies for domestic agriculture and restrictions on exports from abroad. We should not develop a policy that promotes economic development in the developed world at the expense of the developing. Other reasons not to adopt new biofuel approaches relate to unintended consequences. It is easy for the concept of development to transform into GDP, which is dangerous because economic growth can be outweighed by unaccounted for health, environmental, and social costs. In terms of outsourcing to the developing world and thus promoting development in those countries, there is also a question of national security. Food supplies are a critical resource and in implementing policies that encourage greater production of agricultural products abroad at the expense of production at home we can open ourselves up to vulnerabilities. This is a minor concern—supplies are reliable if imported from a great enough number of countries and it is possible to strike a balance between domestic and foreign agricultural production—but needs to be considered.

Question 12

ANSWER:

Biofuel R&D should be targeted at any technologies that meet our climate, energy, development, and other policy goals without generating costly unintended consequences elsewhere. There will be many different individuals interested in developing biofuels—private investors, philanthropists, governments, universities, etc—and each should set their own R&D strategies based upon what each views as the best use of particular funds and expertise. No one knows yet what technology will be the most effective and competition for results between diverse ideas and strategies will hopefully help to make the winning technology and strategies apparent.

Question 13

ANSWER:

Some sources of biofuels—for example, harvesting select pieces of lumber as part of upkeep in forests and national parks—do not seem likely to raise land use problems. It is possible that technologies involving algae or non-consumable elements of food crops could avoid land use issues as well. Others, such those requiring fields devoted to particular crops, do. Demand for biofuels will be met with an increase in supply. Some of this supply may be met through increases to productivity on already farmed land, but not to a degree sufficient enough to meet ever-growing biofuel and food demands (current projections estimate global population in 2050 at 8-10 billion people). GHG are a land use problem. It is possible that GHG emissions from land use changes could be offset through more sustainable agricultural practices, but implementing these on a wide scale could prove difficult and would not make up for losses to biodiversity. Food security is also a concern. Food demands are much easier to meet today in a world with less people and less susceptible to the negative agricultural impacts of climate change than the world will be fifty years in the future. With land use, just as with other issues raised in this consultation, biofuels are only useful as long as they are sustainable into the future.