Our food/agricultural system has many environmental impacts. Suppose you want to try to eat in such a way as to minimize your contributions to global warming. Describe three choices you would choose and explain in detail how those choices will specifically lead to a reduction in global warming.

Cutting meat out of one's diet can have a significant impact on reducing the effects of global warming as agricultural systems and livestock raising specifically, represents a huge portion of global warming. Raising cattle requires large energy inputs in heavy machinery, produces large amounts of methane emissions, and farm runoff can be close to toxic as it contaminates groundwater, water systems, etc. Additionally, the amount of water required in packaging meat is substantially and potentially reason enough; transportation costs and emissions are also important to consider. Not eating meat, specifically red meat, can reduce the emissions created by the agricultural process to raise the meat, subsequently lessening the greenhouse gas effect.

Composting is a quick way to mitigate our greenhouse gas emissions, proving both economically viable and simplistic in its process. As we've covered in class, composting involves natural processes of decomposition, breaking down organic materials and creating a byproduct and source of nutrients for future soils (Brubaker). So, not only is it breaking down our food waste, but it's turning it into a useful resource to grow more food in the future. Depending on the city or country, compost may be collected by local trash trucks and brought to compost centers to be broken down in a few weeks (vs. landfills and incinerators which would take much longer and produce a lot of emissions). While other materials thrown in the trash have no other option but the landfills and incinerators, food waste (and other stuff, but mostly food waste) has the unique opportunity of being composted. Is it pretty? Not really. Does it stink up your kitchen when you collect it? Absolutely. Will it reduce the environmental impacts of our food and agricultural system? Yes!

Buying fruits and vegetables only when they're in season can also mitigate our carbon footprints. When supermarkets have a demand in certain produce, food must be grown using specific chemicals that help it survive the wrong growing periods, transported extremely long distances, racking up huge diesel emissions and the like, and is extremely energy-intensive throughout the entire process. When we have the opportunity to buy produce (*the right kind*), we should opt for the local farmers' market stands or throw a bone to the Amish at the highway gas station. When fruits and vegetables are grown in warmer or tropical places and then shipped out to the Northeast, for example, the resulting emissions are astronomical.

Pretend that you are part of a committee enacting policies to manage Cooper's Woods for HWS. If you were trying to maximize ecosystem services, what are three recommendations that you would make? Explain in detail how each one would directly impact an ecosystem service

Although temperate forests contribute to carbon sequestration, their most significant ecosystem services fail to include climate regulation as its monetary value is so low; this is a necessary fact to consider as maintaining our forests must be profitable in some way, otherwise it's a useless resource. Based on deGroot's calculations, the following services rank the highest in monetary value for the temperate forest biome, from lowest to highest: food (provisioning services) at 299 Int.$/ha/year, genetic diversity (regulating services) at 862 Int.$/ha/year, and recreation (cultural services) at 989 Int.$/ha/yr. My recommendations will maximize ecosystem services that are already doing well.

Cooper's Woods is not yet producing food (for humans at least, and not at a scale or pace comparable to current food systems), but if we establish food crops within the forest, its outputs could increase dramatically, and in turn its recorded monetary value. Recurring annual harvests from the ecosystem require little to no energy input as they are dependent on a canopy to collect solar energy for photosynthesis. Traditional agricultural systems require huge amounts of energy and fossil fuel use (machinery, production/packaging, transportation, crop maintenance, etc.) whereas a food producing forest could maintain itself. Groot's estimated monetary value of 299 Int.$/ha/yr may not be completely true of Cooper's Woods but it certainly could be. Organizing a food forest would mean a "layer system of trees and shrubs of varying sizes, herbaceous perennial vegetation, annual vegetation such as vegetables, root crops, and vertical vegetation such as climbers, legumes, fungi" (Nytofte et al); mulching means less invasive species, low input and maintenance means greater resilience to climate change, and the most important reason to invest in this - it could mitigate food insecurity and malnutrition. This is especially important to consider as Geneva is generally not very wealthy or healthy; food production from converting parts of Coopers Woods into a food forest could be hugely beneficial to Geneva.

The next of temperate forests' highest ranking ecosystem services is genetic diversity at 862 Int.$/ha/yr. Maximizing this service relies more on conservation and investment in these projects. Genetic makeup must be continuously maintained and assessed for evolutionary changes and adaptations in genetic diversity; these conservation methods aim to reduce potentially harmful effects on the forest genetics before anything even happens (Aravanopoulos). Forest resource exploitation (deforestation, habitat degradation, waterway contamination) has become more intensive as a result of climate change and continues to worsen; as global warming accelerates, genetic monitoring will become vital to conserving temperate forests like Coopers Woods

The final service, ranking the highest at 989 Int.$/ha/yr is recreation, which seems true of Coopers Woods given its New England foliage, hiking routes, etc. A recommendation that

doesn’t come from a research article but from personal experience is a boot brush station at the entrance of the forest - simple, I know. But, in countless forests the tracking of species, not just invasives, has caused some serious contamination and harm to ecosystems. I remember when I went to New Zealand, I had to declare hiking boots that had been worn before; they wouldn’t allow anyone to bring foreign soils and organisms in or out, that’s how serious they were. However tame in comparison, I think a boot brush station would not only be practical but a good reminder to recognize Coopers Woods as a healthy and controlled environment that can easily disrupt another with our help.

Suppose you're a member of an organization of municipalities (towns, cities, other areas) that surround Seneca Lake. If you were to enact three new policies that were meant to protect the water quality of Seneca Lake, what would they be, and what arguments would you use to convince your residents to vote for/enact your new policies. Be sure to explain eutrophication and/or HABs in your response.

Lake recreation supervision or restricted hours/access to the lake; although we rely on Finger Lakes tourism for the Geneva economy, we could do less activities in the water or more admiring it from a safe distance. Throughout the warmer months, numerous boats, jet skis, and diesel using vessels travel through the waters and pollute the waters. Combined with sunlight and oxygen, HABs occur all over Seneca Lake. If boat ramps enforced stricter hours and even encouraged non-diesel fuel, water quality could improve drastically. Tax deductions could be offered for switching to fuel alternatives and lake restrictions would fluctuate according to the time of the year, so it wouldn't always be so uptight.

Similarly, nutrient management in regards to agricultural runoff contaminating waterways would be more controlled. The impacts of these chemicals on ecosystems can also result in eutrophication and the like, changing the quality of Seneca Lake. Farms that contribute to this runoff could get some kind of tax write-off for providing better containment of their produced nutrients. It's all about the money, right? While the first example has a greater effect on the general public, this policy would only affect agricultural producers in the Finger Lakes area.

This policy is specific to Seneca Lake, enforcing standards that limit the levels of specific contaminants in drinking water sources, i.e. our lake. As a federal law, drinking water quality policies can be revised each year as new data is collected, observing nitrate, chloride and other chemical levels in our water source.

SOURCES

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