PF Topic Analysis
November 2014

The November topic for Public Forum debaters is **Resolved: On balance, the benefits of genetically modified foods outweigh the harms.** It promises to be an interesting topic filled with numerous strategic options for debaters to pursue. Today, we're going to discuss how to get started with your pro case. For neg ideas, see the neg-side topic analysis (to be published several days after this one).

To begin, let's go over some terms.

First, **on balance** suggests that debaters should use a cost vs. benefits frame for approaching these debates. When considering both the advantages and disadvantages associated with genetically modified foods (GMF), which ends up outweighing? This is the central question you will be debating on this resolution. It is probably very familiar to most of you.

The definitions of the terms **benefits** and **harms** should be obvious. Keep in mind, however, that lots of things can be considered benefits or harms. Human health, the economy, the environment, poverty, happiness, etc can all be involved in these discussions. You will need to be prepared to weigh these disparate concerns against each other and persuade the judge which is most important. That is precisely what **outweigh** means.

Although weighing benefits versus harms seems very straight-forward, do keep in mind that you will need to do work explaining to your judge why certain kinds of impacts are more important than others. For example, if the pro says "GMFs reduce famine" and the con says "GMFs cause long-term health problems," it will not be immediately obvious which of those outweighs the other. That's where you come in—you have to debate it out! Make sure you are always not just explaining why your impacts matter, but also comparing them to your opponents' impacts and determining which concerns should be evaluated first. As the pro in the above example, you may say something like "famine outweighs health concerns because, for many of the world's poor, starvation is a more imminent risk than the possibility of getting cancer somewhere down the line. "

The key phrase in the resolution is **genetically modified foods** (GMF). GMFs are food products (think grains, fruits, and vegetables) that have been genetically engineered by scientists to develop traits that are desirable for one reason or another. Humans have been doing a simple version of this since the dawn of agriculture, by selectively breeding plants with desirable traits to on another, in order to encourage seeds to carry that trait. This process accounts for a large amount of the genetic variation we see in plants today (i.e. all the different varieties of tomatoes available). GMFs, however, accelerate this process, by allowing bioengineers to directly insert new traits into the genetic code of an existing organism. These are changes that do not otherwise exist in nature.

There are many reasons food may be genetically modified, but the most common ones are to make a crop hardier, more resistant to pests or disease, to grow larger or faster or with more nutrients, etc. It is also possible to genetically modify livestock to achieve desired size, fattiness/leanness, etc. Generally, modifications result in making the product less labor-intensive, more profitable, or both.

You can find a list of which crops are most likely to be genetically modified here. Knowing these may help improve the specificity of your claims on either side.

It is also important to note that **this resolution is global** in scope—it is not restricted to the United States. As you will see, many of the best pro arguments for GMFs involve the interests of foreign nations. Those impacts are fair game, since the resolution does not specify any particular countries.

However, keep in mind that some nations have much stricter laws regarding GMFs than the United States does. If you want to make arguments about a particular nation, you should look into what their GMF laws look like.

Now that we know what all of the terms in the resolution mean, let's discuss what the **ground** for both sides looks like.

The **pro** must defend that genetically modified foods are more good than bad. This does not mean they have to win that GMFs are *always* good, or that they have no downsides. Moreover, the pro doesn't necessarily have to advocate any kind of change to the status quo or *increase* in the use of GMFs. The pro team is fully within their rights to simply defend the status quo, because we have GMFs now. They *can* argue that GMF usage should be increased if they want to, but it's not necessarily their burden to do so. Another strategic consideration for the pro is that nothing in the topic forbids them from acknowledging risks and advocating increased scientific study of GMFs. Pro teams may occasionally find

it useful to frame their argument as "we must continue researching and developing new GMFs that will be better than existing ones." Additionally, any future development will always be subject to rigorous testing, safety regulations, and oversight. You can (and should) point out that supporting GMFs doesn't mean supporting totally unregulated GMF anarchy!

The **con**, of course, must win that GMFs are more bad than good. They don't need to win that GMFs are *always* bad in every instance, or that GMFs do not offer any advantages. This topic is somewhat complicated for the con due to the fact that GMFs are the status quo, so negating them seems to invite the con to advocate some kind of counter-proposal. That is something you don't usually see in PF. Depending on your debate circuit, you may or may not see this kind of strategy. The vast majority of con teams, however, will likely just default to status quo minus GMFs.

Either side could easily concede a handful of opponent arguments about why GMFs are good/bad and still win the debate, as long as they win "on balance" that the good/bad outweighs. So, strategic teams will isolate some big impacts for their side, then make some defensive mitigation arguments against their opponents' other impacts. They will also set up a weighing mechanism for deciding which impacts are "most important." This should involve traditional timeframe/magnitude/probability discussions, but some teams may also want to introduce arguments about ethics or other more nebulous concerns.

Clearly, both sides are going to be looking to rack up some big impacts. Next, we're going to cover some **key arguments for the pro**, along with some evidence to get you started.

One of the most common pro impacts on this topic will be **food production**. The central argument here is that GMFs create larger yields and allow agricultural production in areas that otherwise would not be very fertile (because of minimal rainfall, harsh temperatures, etc). Because the world's population keeps growing while our total arable land area stays the same, humans must find ways reap more food from the same amount of ground. GMFs, the pro will argue, are an obvious way to meet this challenge. The fact that GMFs exist on a global scale now (including in poor nations), while other solutions are still in the "idea phase," makes GMFs particularly attractive.

Here is **evidence** on this point:

> *(Sheetal Ann Lamichhane, Jawaharalal Nehru Krishi Vishwa Vidyalaya, Adhartal, Jabalpur, Madhya Pradesh, International Journal of Genetic Engineering and Biotechnology, Volume 5, Number 1, pp. 43-48 http://www.ripublication.com/irph/ijgeb-spl/ijgebv5n1_06.pdf, 2014)*
>
> As the world's population continues to increase there is an increase demand for food. Since the total area for planting is not increasing we need to find another solution for food security that will meet the growing population demand. There are number of ways by which we can increase productivity in a sustainable way, but the question is that still such means meet the demand for growing population. In the 21st century Biotechnology has been applied as one of the eco-technopolitical technology. Many developed countries have opted to incorporate the technology to improve their productivity. One such way to meet the demand is by using Genetically Modified food (GM food). GM foods are produced from organisms that have had specific changes introduced into their DNA using the methods of genetic engineering. By using GM foods there are many advantages such as disease resistance, cold resistance, drought

tolerance, herbicide resistant, nutrition availability. And by having such advantages we can meet the growing demand of the population Whereas Organic foods are the foods produced using methods of organic farming-with limited modern synthetic inputs like pesticides and chemical fertilizers. But the real question is that will Organic farming meet the entire requirement regarding food security in the world. Thus due to the possibilities offered by GM technology in this new century, we have got the solution that is unmatched and that will give the world food security in the coming years. By the application of GM foods we will meet the shortcomings in the productivity of the present time so that the future world is secure and safe regarding food.

More **evidence**:

(Elizabeth Shoo, DW (German news source), "Can genetically modified crops end hunger in Africa?", http://www.dw.de/can-genetically-modified-crops-end-hunger-in-africa/a-17385964, 1/24/14)

The UN estimates that 223 million people in sub-Saharan Africa suffer from malnutrition. Long periods of drought have resulted in poor corn and millet harvests. For years, African politicians have called for the introduction of genetically modified (GM) plants as a means to halt the decline in yields. At an African Agriculture Conference in 2012, 24 African countries agreed to allow the use of genetically modified crops.

But so far, commercial use of genetically engineered seeds is permitted only in South Africa, Egypt, Sudan and Burkina Faso.

Calestous Juma can't understand the other nations' reluctance. Governments should be more open to GM crops, the professor of the Practice of International Development at Harvard University said.

"There may be some areas where you need GM seeds and there may be areas where GM seeds are not necessary," Juma said. "That choice should be left to the farmer."

A chance for arid regions

Arid regions above all would profit from genetically modified seeds, Juma said. US agriculture giant Monsanto has in fact developed drought-tolerant seeds, named Water Efficient Maize for Africa (WEMA). On its website, Monsanto advertises that WEMA could feed an additional 21 million people. The corn was grown conventionally, but field tests for the genetically modified version are underway in Mozambique, Tanzania and Uganda.

"What all farmers want is to produce more with less," said Brandon Mitchener, Monsanto public affairs head in Europe, the Mideast and Africa. "They have a finite amount of land, they have a finite amount of resources, and they want to get the maximum yield from their land with the seed and the water and the manpower they have to farm that land."

Careful readers will note that the above card quotes Monsanto representatives, who are obviously biased. However, the claim that 223 million people suffer from lack of food, AND that we already have GM technology that can save 21 million of them, is persuasive. You can further argue that as GM technology advances, the number of lives saved will only increase.

This type of argument can be super-charged by “climate change inevitable”/”we’re already past the point of no return”/”focusing on adaptation key” –type arguments. The claim is that, in addition to a

growing population, climate change will both decrease the total land surface area of the Earth (as oceans rise) and will disrupt weather patterns, leaving existing agricultural land infertile. Pro teams can argue that it is too late for humans to *reverse* climate change, and that instead we should focus our energies on *adapting* to the coming challenges.

Here is **evidence** arguing climate change is harming food security now, and adaptation is key:

> *(Katherine Richardson, Professor in Biological Oceanography at the University of Copenhagen, Will Steffen, Hans Joachim Schellnhuber, Joseph Alcamo, Terry Barker, Daniel M. Kammen, Rik Leemans, Diana Liverman, Mohan Munasinghe, Balgis Osman-Elasha, Nicholas Stern, Ole Wæver, "Social and Environmental Disruption," in Climate Change: Global Risks, Challenges & Decisions, International Alliance of Research Universities, University of Copenhagen, http://curis.ku.dk/ws/files/14774466/http___climatecongress.ku.pdf)*
>
> One of the best indicators of the impacts of climate change on societies is human health and well-being (Box 3). The observed temperature rise to date**,** about 0.7oC, is already affecting health in many societies; the increasing number of extreme weather events**,** such as heat waves, floods, and storms**,** is leading to a growing toll of deaths and injuries from climate-related natural disasters1. Beyond the direct impacts on health, climate change also affects the underlying determinants of health – quantity and quality of food, water resources, and ecological control of disease vectors16 (session 14). The nexus between climate change, human health and water systems is particularly strong**.** As for health, the impacts of climate change on water systems are already apparent in many parts of the world**,** with accelerating impacts likely for several decades irrespective of future agreements to abate emissions of greenhouse gases

(Box 4). For example, droughts and drying are leading to social instability, food insecurity and long-term health problems in some regions now as livelihoods are damaged or destroyed16 (session 14). Such impacts often drive a strategy of short-term survival at the expense of longer-term adaptation. Nevertheless, *adaptation measures to lessen the impacts of climate change are urgently needed now.* Given the considerable uncertainties around projections of climate impacts on water resources at local and regional scales, building resilience, managing risks, and employing adaptive management are likely to be the most effective adaptation strategies16 (session 29). Even with effective adaptation, the impacts on water resources in many parts of the world will be severe with climate change associated with only 1.0 to 1.5oC rises in temperature23.

Here is **evidence** that GMFs can solve problems caused by climate change:

(Rachel Shields, Independent, http://www.independent.co.uk/life-style/food-and-drink/news/gm-crops-have-a-role-in-preventing-world-hunger-chief-scientist-says-1823219.html, 11/19/09)

GM crops have a role to play in preventing mass starvation across the world caused by a combination of climate change and rapid population growth, a senior government scientist said yesterday. Professor Robert Watson, the chief scientific adviser at the Department for Environment, Food and Rural Affairs (Defra), called for UK trials of GM foods, arguing that the Government needs to be more open with the public about the risks and benefits of genetically

modified foods. “Over the next 20 to 50 years, the population is going to increase from 6.5 to 9 billion. There will be more extreme weather, more demand for food, meat, and water, a changing climate: it is a very challenging situation, which, if we don’t deal with it, could become a nightmare scenario,” said Professor Watson. “We have to look at all the technologies, policies and practices, all forms of bio-tech, including GM.” “We need to have trials in the UK, and to make them open and transparent,” Professor Watson added. “We’d have to protect them, to stop them getting trashed. There are a whole range of situations in which science can play a very important role. We’ll need seeds which are more temperature- and pest-tolerant.”

You can also argue that GMFs solve **malnutrition**, because crops can be engineered to contain more vital nutrients. This is particularly important in regions where deficiencies of particular vitamins are rampant. For example, vitamin A deficiencies kill or blind close to one million children every single year.

Here is **evidence** on this point:

(James Dale, Ph.D., of Queensland University of Technology in Australia http://www.foxnews.com/health/2014/09/25/it-is-okay-to-eat-genetically-modified-foods/ 9/25/2014)

"In 2004, the Bill and Melinda Gates Foundation put out a call to create crops with enhanced micronutrients, like our 'golden banana,'" Dale says. "To date, my team has received close to $10 million in funding." The fruit has been engineered for higher levels of vitamin A to combat a deficiency that blinds or kills nearly a million children worldwide annually. "It's not dissimilar to

pharmaceutical companies," he says. "Everyone complains about Big Pharma until they get sick and want the best medicine. But where labels provide important information, I think that is very worthwhile."

Many con teams on this topic will choose to argue that GMFs harm the environment for various reasons. Strategic pros will want to be prepared to contest this claim by arguing **GMFs are *more* environmentally friendly**. The warrant here is that GMFs require less herbicide and insecticide use, as well as use less fossil fuels required to power farm machinery (such as tillers and pesticide sprayers). The pesticides that are used on GMFs may also be less damaging than those used on conventional crops.

Here is **evidence**:

(Dr. Jennifer Thomson, BSc in zoology from Univ. of Cape Town/MA in genetics from Cambridge/PhD in microbiology from Rhodes University/post-doctoral fellow at Harvard, "Food For Africa: The Life and Work of a Scientist in GM Crops," 2013)

If GM crops are safe for humans and animals to eat, what are their effects on the environment? One of the most striking effects has been associated with insecticide and herbicide use. Since 1996, the use of pesticides on crops has reduced by 8.7 per cent, largely due to the planting of GM Bt cotton, a crop which, without GM, has traditionally been an intensive user of insecticides. Planting of herbicide-resistant crops has led to a decrease in the overall environmental impact of 16 per cent (Brookes, 2012). This is largely due to a switch to active ingredients with a more environmentally benign profile than the ones generally used in conventional crops. In addition GM crops are contributing to lower levels of greenhouse gas emissions by two principle means.

Firstly, there is a reduction in fuel use due to less frequent herbicide and insecticide applications. Secondly, there is a contribution due to the switch to 'no-till' or conservation tilling. Under normal tilling farmers will plough the soil, prior to planting seeds, in order to allow weeds to grow. They then spray with herbicides, but before they can plant they have to allow the toxic chemicals to dissipate, a process which can obviously contribute to the loss of top soil. When planting GM seeds, crops and weeds can grow together and the farmer can spray when he or she sees fit. Most of these farming practices do not apply to many smallholder African farmers, few of whom can afford insecticides or herbicides. However, there are those who do use pesticides, specifically on cotton, which requires frequent treatment. A study on smallholder farmers in India shows that Bt cotton has reduced pesticide applications by 50 per cent, with the largest reductions (70 per cent) occurring in the most toxic types of chemicals. Results confirm that this has notably reduced the incidence of acute pesticide poisoning among cotton growers. These effects have become more pronounced with increasing technology adoption rates. Bt cotton now helps to avoid several million cases of pesticide poisoning in India every year, which also entails sizeable health cost savings (Kouser and Qaim, 2011). To quote an African woman farmer from KwaZulu-Natal, farming Bt cotton, who addressed the audience at a meeting at the Vatican: 'Look at my hands— they don't look like a farmer's anymore!'

The above also contains an argument than **GMFs reduce emissions**, which you could spin into arguing that they improve air quality or mitigate climate change. If you choose to do either of these things, make sure you complete the argument with an impact.

More **evidence** on GMFs and the environment:

> *(Natasha Gilbert, Nature (international weekly journal of science), "Case studies: A hard look at GM crops," http://www.nature.com/news/case-studies-a-hard-look-at-gm-crops-1.12907, 5/1/13)*
>
> On balance, herbicide-resistant GM crops are less damaging to the environment than conventional crops grown at industrial scale. A study by PG Economics, a consulting firm in Dorchester, UK, found that the introduction of herbicide-tolerant cotton saved 15.5 million kilograms of herbicide between 1996 and 2011, a 6.1% reduction from what would have been used on conventional cotton[2]. And GM crop technology delivered an 8.9% improvement to the environmental impact quotient — a measure that considers factors such as pesticide toxicity to wildlife — says Graham Brookes, co-director of PG Economics and a co-author of the industry-funded study, which many scientists consider to be among the field's most extensive and authoritative assessments of environmental impacts.

Another environmental impact the pro can claim is **deforestation**. The argument is that the need for increased food stocks is driving people to plow down forests in order to clear more land for growing crops. You will want to argue that GMFs can stop this by improving per-acre crop density, solving food insecurity without requiring forest conversion. Of course, this will require you to win the "GMF solves food production" argument above. Deforestation has a number of serious impacts.

Here is **evidence**:

(Pinstrup-Andersen, Director General of the International Food Policy Research Institute (IFPRI), "TOWARDS A SUSTAINABLE GLOBAL FOOD SYSTEM: WHAT WILL IT TAKE?," 2002 http://www.ifpri.org/pubs/articles/2002/pinstrup02_01.pdf, Keynote presentation for the Annual John Pesek Colloquium in Sustainable Agriculture, Iowa State University, March 26–27, 2002)

Deforestation has important local and global consequences, ranging from increased soil and water degradation to greater food insecurity (especially among indigenous peoples who depend on forest products for food, fiber, medicines, or income), escalating carbon emissions, and loss of biodiversity. Small-scale, poor farmers clearing land for agriculture to meet food needs accounted for roughly two-thirds of the world's deforestation in the 1980s and 1990s. This conversion of forested areas, driven by food insecurity, will continue over the next twenty years, particularly in Africa, unless farmers have alternative ways of meeting food needs. Furthermore, these needs will accelerate with population growth in rural areas. Commercial logging interests account for much of the remaining deforestation, especially in East Asia and West Africa. Although there is no consensus on the amount or location of forest that this generation should bequeath to the next, there certainly is evidence that the world's forests are neither properly managed nor, when converted into other assets, sufficiently productive to allow future generations to meet their needs.

Another common con argument will be that GMFs breed resistance, leading to "superbugs" or "superweeds." The pro can answer that **resistance is not a threat**, because we already know how to combat resistant species. Farmers can simply grow a few non-GMF crops nearby, and allow them to be eaten by pests. Any insects with a resistance mutation, then, will mate with non-resistant bugs, making it unlikely that their offspring will carry the resistance gene. This has been tried and proven effective.

Here's **evidence**:

> *(Dan Charles, NPR, "insects find crack in biotech corn's armor," http://www.npr.org/blogs/thesalt/2011/12/05/143141300/insects-find-crack-in-biotech-corns-armor 12/5/12)*
>
> But from the beginning, scientists worried that biotech companies were overusing Bt and increasing the chances that it would eventually stop working. Why? The key word is resistance.
>
> The more widely you spray any insecticide, the more likely you are to uncover and promote the growth of a new strain of insects that's resistant to your insect killer. It has happened with one insecticide after another over the decades. Eventually, scientists said, the same thing would happen to a crop that carries its own insecticide. Covering fields with Bt crops would lead to a strain of insects that the crops didn't kill.
>
> So university researchers and federal regulators came up with a strategy to preserve Bt's effectiveness. First of all, they said Bt crops (mainly corn and cotton) should be extremely effective. Ideally, they would kill 99.99 percent of all the target insects that fed on them.

> And for those rare insects that survived, regulators came up with a second line of defense, to prevent resistant insects from mating and producing lots of resistant offspring. Farmers who grew Bt corn (or cotton) were required to grow non-Bt crops on some of their farm, as a "refuge" for normal insects. That way, the rare, surviving, resistant insects would probably find non-resistant mates, instead of each other, and their offspring still would (likely) be killed by the Bt corn.
>
> To the surprise of some environmentalists, the strategy has worked. There's no evidence that the European corn borer has evolved resistance to the Bt toxin. The same goes for some insects that feed on cotton, such as the pink bollworm — at least in the United States.

Additionally, “superweeds” are caused by farmers’ bad practices, not GM crops. This is proven by the existence of herbicide resistant weeds even in areas without GMFs.

Here is **evidence**:

> *(Jon Entine & XiaoZhi Lim, Genetic Literacy Project, “Union of concerned scientists blames GMOs for ‘superweeds’ but issue more complex,” http://www.geneticliteracyproject.org/2014/05/06/video-union-of-concerned-scientists-blames-gmos-for-superweeds-but-issue-more-complex/, 5/6/14)*
>
> Are Roundup Ready crops to blame for “superweeds”, as UCS and anti-GMO activists contend? Herbicide resistance in weeds developed long before the adoption of herbicide-resistant GM

crops. Andrew Kniss, professor of weed biology and ecology at the University of Wyoming observed that the first glyphosate-resistant weeds "evolved in Australia, where no GM crops were grown" back in 1996. GM crops played no role in their development.

Weed resistance developed because of the way glyphosate was used in tandem with monoculture farming by some farmers looking for shortcuts. "Glyphosate-resistant weeds evolved due to glyphosate use, not directly due to GM crops," wrote Kniss. Some farmers found it easier to simply plant the same crops and control weeds with a single herbicide, glyphosate, year after year.

Finally, all pro teams will want to be ready to win that **GMFs are safe to eat**. The evidence is on your side on this question, because virtually all studies have shown no health effects. You will want to argue that scientific consensus should be preferred to a handful of (probably not well-qualified people) who remain afraid of GMFs.

Here is **evidence**:

(Tamar Haspel, food & health writer, Washington Post, "the gmo debate: 5 things to stop arguing," http://www.washingtonpost.com/lifestyle/food/the-gmo-debate-5-things-to-stop-arguing/2014/10/27/e82bbc10-5a3e-11e4-b812-38518ae74c67_story.html, 10/27/14)

It's impossible to be certain that a GM food, or anything else, is safe. But all uncertainty is not created equal, and the chance that the genetically modified crops in our food supply pose a danger to human health is extraordinarily small. There have been thousands of studies on these foods, many of them long-term and independently funded, and virtually every mainstream science organization has come down on the side of safety.

One of the most compelling studies came out just last month, and it had billions of subjects that eat GMOs almost exclusively: livestock. Researchers from the University of California at Davis looked at health data on more than 100 billion animals and found no ill effects — in fact, no effects at all — attributable to a switch from non-GMO feed to GMO.

There is a consensus on the safety of GM crops. Consensus doesn't mean every last person on the planet; there are people who still say GMOs are dangerous, and some of those people have advanced degrees. But siding with those people, in the face of the consensus, just makes it easier for others to dismiss you as an anti-science (more on that later) zealot. Arguing that GMOs pose a significant human health risk is unreasonable.

More **evidence**:

(David H. Freedman, Scientific American, "The Truth About Genetically Modified Food," http://www.scientificamerican.com/article/the-truth-about-genetically-modified-food/?page=1, 8/20/13)

Critics often disparage U.S. research on the safety of genetically modified foods, which is often funded or even conducted by GM companies, such as Monsanto. But much research on the subject comes from the European Commission, the administrative body of the E.U., which cannot be so easily dismissed as an industry tool. The European Commission has funded 130 research projects, carried out by more than 500 independent teams, on the safety of GM crops. None of those studies found any special risks from GM crops….Plenty of other credible groups have arrived at the same conclusion. Gregory Jaffe, director of biotechnology at the Center for Science in the Public Interest, a science-based consumer-watchdog group in Washington, D.C., takes pains to note that the center has no official stance, pro or con, with regard to genetically modifying food plants. Yet Jaffe insists the scientific record is clear. "Current GM crops are safe to eat and can be grown safely in the environment," he says. The American Association for the Advancement of Science, the American Medical Association and the National Academy of Sciences have all unreservedly backed GM crops. The U.S. Food and Drug Administration, along with its counterparts in several other countries, has repeatedly reviewed large bodies of research and concluded that GM crops pose no unique health threats. Dozens of review studies carried out by academic researchers have backed that view.

The above card will also be useful for answering con claims that the science is flawed because it is funded by the bioengineering industry. This evidence proves that a wide array of experts have all arrived at the same conclusion: GMFs pose no health risks.

That covers the basics. You should now be ready to build a solid pro case!

Of course, it is important to remember that this guide is only meant as an introduction to help you get started. You should use this as a starting-point for your research, and get creative. Don't be afraid to try some new things.

Don't forget that you can always email completed cases to **Rachel.Stevens@NCPA.org** for a free, confidential case critique! We'll get them back to you, with personalized comments, within 3 business days.

Good luck, PFers!