Dear Members of the Hawai’i County Council,

We represent Biology Fortified, Inc., a non-profit organization made up of volunteer scientists who are experts in agriculture, including pesticides and biotechnology. We have no ties to the biotech industry, and work to provide science-based information to the public. We are writing to you to provide background information and guidance about the potential consequences of Hawai’i Bill #79 Draft 2 from a science-based perspective. Unfortunately, this bill does not have a strong grounding in science. We will demonstrate this below.

First, it is important to understand that genetically modified plants are among the most highly studied foods that humans eat. There are literally hundreds of published, peer-reviewed scientific studies that have been conducted on them. Biology Fortified, Inc. is assembling a publicly accessible database of these studies, called the GENetic Engineering Risk Atlas, or GENERA. This is accessible at www.biofortified.org/genera/, and on the whole, these studies support the safety of these crops for human health and the environment. Approximately one third of these studies are independent of industry funding, and the conclusions of these independent studies are in agreement and do not contradict those with industry ties. Reports commissioned by the National Academy of Sciences, along with a compendium of research from the EU, conclude that genetic engineering is not per se more risky than other breeding methods.

http://www.nap.edu/openbook.php?record_id=12804
http://www.nap.edu/openbook.php?isbn=0309092094

Genetic engineering does not introduce any new classes of risk that are not already present with traditional plant breeding. It is a process by which a new trait is introduced, such as pest resistance, disease resistance, and tolerance to drought and other stresses. It differs from other methods used in plant breeding to alter the genetics of crops in that it widens the range of genetic diversity that can be used in breeding to include genes from species outside those that can be crossed through previous plant breeding techniques. This can bring in needed traits that would otherwise be extremely difficult to achieve through other methods.

For instance, scientists at the University of Hawai’i developed papaya trees that are resistant to the papaya ringspot virus, which has had a devastating impact on the papaya industry in the state of Hawai’i. By using a piece of one the virus’s own genes, the trees were effectively immunized against infection, and today, most of the papaya plantations in Hawai’i are planted with these genetically engineered trees. This is a great example of a local Hawai’ian success story with this technology, which should be kept in mind when regulating this technology at a local level.
A trial of genetically engineered virus-resistant trees on the right, compared to susceptible trees on the left.

In sum, there is no reason to think that living near field trials of experimental genetically modified plants poses any additional risk to the residents of Kaua'i, and indeed, there are benefits to the local farming economy from such trials.

We will now address some of the issues in specific sections of the bill.

Section 14. ___ Findings and Purpose

(4) The bill brings up the “Precautionary Principle”, saying that it is inherent in the public trust doctrine. Inherent in the public trust doctrine is the idea that a precautionary approach should be applied to new technologies, policies, etc, however, the Precautionary Principle is a very specific political concept that some organizations wish to substitute for a risk analysis. The Precautionary Principle states that new technologies should be prohibited until it can be determined that they pose no (zero) risk of harm. This is not how risk analysis is done. You cannot demonstrate that anything has zero risk, whether it is engineering a new trait in a crop plant, to driving a car, or using the internet. Every activity that human being engage in carry some level of risk, indeed risk of permanent harm to the world, and if the Precautionary Principle were applied to all such activities, we would do nothing.

A real risk analysis takes into account the risks and benefits of an action. The Precautionary Principle does not take into account the benefits of an action - only the risks. The Precautionary Principle, as codified, is not a risk analysis but a political tool used by its proponents for blocking only certain actions, and not others. The Precautionary Principle is not the same thing as taking a precautionary approach to risk
analysis, that is, attempting to determine what downsides there are while evaluating the benefits of an action. Anticipating potential downsides is a natural and right course of action in any situation, however, a risk analysis cannot exclude the benefit side of the equation.

The benefits of an action can also be seen as the risk of not acting. In Impact of the Precautionary Principle on Feeding Current and Future Generations, a position paper by the Council for Agricultural Science and Technology (CAST), it is argued that the Precautionary Principle is self-defeating because the principle itself gives rise to risk. http://cast-science.org.cast.sitevizenterprise.com/download.cfm?PublicationID=276208&File=1030df6c4bf9e6d2086d211a3c242a317a7cTR

"The precautionary principle forbids genetic modification of food because it gives rise to risk, but the precautionary principle also forbids forbidding of genetic engineering of food because forbidding genetic engineering of food gives rise to risk."

Hawai‘i has a cogent, local example of how this plays out in practical terms. If the Precautionary Principle were to be invoked to prevent the development of genetically engineered virus-resistant (PRSV-R) papayas, then the papaya industry in the state would have been put at risk of being wiped out by the papaya ringspot virus, or at the least severely harmed. Strangely, Bill 79 Acknowledges the importance of this public project to protect papayas from this disease using genetic engineering, but apparently does not take this lesson to heart by prohibiting almost all other uses of the technology.

(5) This section falsely claims that the “Precautionary Principle” was affirmed by the Intermediate Court of Appeals. http://www.courts.state.hi.us/docs/opin_ord/ica/2013/April/ica29440ada.pdf Nowhere does this principle appear in the court decision, which can be viewed above.

(7) This section implies that definitive science does not exist about the risks and benefits of genetically engineered crops. We refer you to the discussion of the many hundreds of peer-reviewed scientific studies above.

(8) This section states that the federal government does not require safeguards for the development of genetically engineered crops and animals. This is untrue. While Hawai‘i County may not have specific regulations related to genetically modified organisms, the United States federal government has a system of regulations under the Coordinated Framework, set up in 1994 by the White House Office of Science and Technology Policy. Under the Framework, the Food and Drug Administration is responsible for the food and feed safety of genetically modified organisms. The Environmental Protection Agency is responsible for the safety and proper use and labeling of pesticides, including pesticidal substances produced by genetically modified plants. The United States Department of Agriculture is responsible for safety of US agriculture, including protecting the environment from plant pests and noxious weeds, as well as consideration for human and animal health. A field test of a genetically modified organism must
be reviewed and approved by the USDA. The state of Hawai‘i, as with any other state, has the
right to further review and approve or disapprove the field trial. The Environmental Protection
Agency is also responsible for the regulation of pesticides. A field test of an experimental
pesticide must be reviewed and approved by the EPA. These agencies have the authority to
impose additional safety conditions if the organization applying to conduct a field test has not set
safety conditions that are stringent enough. These safety conditions include safeguards for the
environment, including any threatened or endangered species or species proposed for listing, of
which Hawai‘i has many.

(11) This section highlights a very important issue. As mentioned above, genetic engineering has
been credited with preventing the loss of Hawai‘i’s valuable papaya farms and industry. That was
a case of the technology being used for good use, and at first glance this section appears to
acknowledge that fact and the importance of the technology in Hawaiian agriculture. However,
no definition is given for what exactly constitutes “imminent danger of extinction.” If this section
were used as guidance for a future crop calamity, such as with coffee bean production, by not
defining any thresholds it puts farmers into uncertain political territory. To go further, it sets a high
bar for evaluating the benefits of the technology. If, for instance, a new trait were generated in
coffee plants that protected against the Coffee berry borer, it could have benefits for Hawaiian
coffee production that would include fewer losses, and fewer insecticides applied. Is the total
loss of coffee production in Hawai‘i therefore a reasonable measure of whether or not such a
trait should be used? We contend that it is not.

(14) This section is making an economic argument for not allowing the use of genetic
engineering on the Island of Hawai‘i. While ignoring the fact that it exempts papayas and
ornamentals, this amounts to an argument that Hawai‘i’s economy will benefit from restricting or
eliminating this technology through a price premium or increase in demand. However, no
evidence is presented that any such economic activity is underway or is hindered by the
presence of genetically engineered crops grown for food or testing. Indeed, as presented by this
bill, the state of Hawai‘i as a whole has a significant economic stake in the development of this
technology, the loss of which would surely have a negative impact.

(16) This section states that the purpose of the bill is to protect the right of individuals to farm
how they choose to farm. However, to accomplish this, the bill intends to abridge the very same
rights of other farmers. No farmer, whether they grow genetically engineered or non-GE crops
has a superior right in this regard. By upholding only the right of one class of farmer to farm the
way they choose as a tool to prevent the other class of farmer to farm the way they choose is
preferential treatment, and is not considering the rights of all farmers equally.

14-___ Definitions

“Physically Contained” This definition arbitrarily determines a separation distance, buffer zones,
the use of greenhouses, and signage. The USDA already sets science-based terms for the
conduct of field trials, that are specific the the crop being considered and local conditions. This
would duplicate and/or override the authority of the USDA and the value of a science-based process. The mandate of signage is also particularly problematic, as it may open up field trials to cases of sabotage.

The exact locations of field tests may be kept private from the general public for a variety of reasons, including ensuring that the scientific integrity of the tests is not disturbed, to keep members of the public from going onto the field at times that they might be harmed by the activities in the field, to protect workers in the field, and to reduce the potential for sabotage or destruction of the trial. Considering the thorough science-based regulation of genetically engineered plants, the potential harm of notifying the public of exact locations of field tests outweighs any potential benefits.

Indeed, it seems that the risk of vandalism and sabotage by individuals and organizations opposed to genetically engineered crops is particularly high in the state of Hawai‘i. While these cases subsided in recent years around the US, in Hawai‘i, papaya farmers have had their trees slashed in both 2011 and 2012, in protest against genetically engineered papayas. ([http://www.biofortified.org/2013/06/gmo-crops-vandalized-in-oregon/](http://www.biofortified.org/2013/06/gmo-crops-vandalized-in-oregon/)) Providing a means to mandate disclosure of field trials in the local area may encourage activists to engage in similar acts. If a new virus-resistant papaya was being developed for Hawai‘ian farmers, this definition and requirement may enable individuals and organizations to seek out and chop down such trees, destroying years of research and putting Hawai‘ian farmers at risk of losing their crops to disease.

![Image](image.jpg)

*In 2012, genetically engineered papaya trees were vandalized*

Much of the requested data for genetically modified organisms is already available. Anyone can visit the public website [http://www.isb.vt.edu/data.aspx](http://www.isb.vt.edu/data.aspx) to search for data provided by the USDA about field trials. Specifically, one can obtain information about field trials that includes the organization running the trial, the number of acres, the type of plant, the dates during which the trial will be conducted, the state in which the trial will be conducted, and the phenotypes or traits
being tested. Because the State of Hawai‘i reviews all applications for field tests, Hawai‘i could potentially request from the State some more specific information for tests conducted in Hawai‘i.

14-___ Prohibitions

The USDA conducts an evaluation of each field test application for genetically modified organisms, including consideration of safety for humans and the environment. Genetically engineered organisms undergo much additional evaluation in the petition for deregulation process. Setting a moratorium for planting of genetically modified plants overrides the entire science-based federal regulatory process. Indeed, under (b), this section takes the extraordinary measure to declare any genetically engineered organism that may be fully approved by the United States Government to be automatically declared an “imminent endangerment of agricultural health and environmental health.” There is no evidence that would reasonably support such a classification.

14-___ Exemptions

This is perhaps the strangest part of Bill 79 (draft 2). The entire bill seeks to eliminate the use of genetically engineered crops for field trials and production, except those conforming to arbitrary guidelines. The argument is presented, without evidence, that such crops are dangerous to human health and the environment, when the evidence suggests the opposite (see discussion above in introduction). If the arguments presented in the justification for this bill were valid, there would be no cause to exempt any genetically engineered crop, whether papayas or ornamental crops. The presence of these exemptions in the bill indicate that the council does not accept its own arguments about the regulation of genetically engineered crops.

The buffer zones and other rules applied to Papaya production is not science-based nor necessary to prevent the potential harms outlined in the bill. Papaya trees, when grown from seed, need only be grown from seed that was the result of a controlled cross between trees that are non-genetically-engineered to themselves be non-GE. This can be accomplished merely by tying a bag over bisexual papaya flowers before they open to produce seed that is not the result of outcrossing. If a papaya farmer wishes to take steps to produce an identity-preserved non-GE papaya product, this is a simple and necessary step, and will be effective no matter how close or distant any GE papaya farms are. When it comes to production, pollen from GE papaya trees do not make the fruit genetically engineered, so the identity of the crop is preserved without any such buffer zone. Indeed, non-GE papaya farmers can benefit from neighboring GE papaya farms through a process called cross-protection, where the resistant plants help protect the non-resistant plants by slowing the spread of the disease. This is akin to the “herd immunity” of people who have been vaccinated against diseases, which protects non-vaccinated people by slowing or preventing the spread of diseases. Introducing arbitrary buffer zones and rules for papaya production in Hawai‘i would put a burden on GE papaya farmers, and provide no actual benefit (and potential harm) to non-GE papaya farmers.
Section 14-___ Administration

It is clear that there would be administration costs associated with this ordinance, however, no analysis is presented about the financial and human resources impact this would have on the county.

Section 14-___ Registration

This section is also problematic. It states clearly that “all persons using genetically modified or transgenic manipulated produce or products of any kind shall register annually with the department.” It does not state all production operations, or farms, or manufacturers, but simply all persons using genetically modified produce or products of any kind. Therefore, this could be construed to include every person who makes or sells (or eats or wears) produce or products from genetically engineered crops within the County of Hawai‘i whether or not it was physically grown in the county. The bill explicitly does not prohibit the use of GE crops produced outside the County of Hawai‘i for other uses, however, this section explicitly states that all persons using them must register with the County. This is an absurd arrangement both from a scientific and a regulatory standpoint, and we strongly urge that it be reconsidered.

Conclusion

In conclusion, we ask that the Council of Hawai‘i consider the science-based regulation that is already conducted at the federal and state levels, and the impact that this bill would have on the citizens of Hawai‘i.

Sincerely,
Biology Fortified, Inc.

To contact us about this letter, and for answers to any questions that you may have, please contact:
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