Assessing the Morality of Syngenta in the Production and Distribution of Atrazine Using Care Ethics

STS Research Paper
Presented to the Faculty of the
School of Engineering and Applied Science
University of Virginia

By

Lindsey Stegenga

May 13, 2021

On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

Signed: _____
Lindsey Stegenga

Approved: _____ Date _____
Benjamin J. Laugelli, Assistant Professor, Department of Engineering and Society

Introduction

Atrazine is a chemical invented by the company, Syngenta, and it is one of the most widely used pesticides in the United States. A few scholars have considered the ethics of widespread pesticide use applying principles such as utility and sustainability. Many other scholars have studied and written about atrazine extensively, yet most peer-reviewed articles focus on its effects on wildlife and whether it is truly a risk to human and environmental health. Consequently, peoples' understanding of the case of production and sale of atrazine by Syngenta in the United States is limited because the case has not been considered from an ethical standpoint. Examining the case of atrazine from an ethical perspective can yield valuable insight into the relationship between Syngenta, its consumers, and the environment that science alone cannot provide. Additionally, it leads to a more complete understanding of the case as different values are prioritized, rather than economy or scientific data that may or may not be accurate. Syngenta is not acting morally in its treatment of both human and environmental wellbeing, as atrazine harms wildlife and has negative impacts on human health. I will argue that Syngenta's actions are unethical using the framework of care ethics, inspired by Carol Gilligan and built upon by Berenice Fischer and Joan Tronto, analyzing this case from Fischer and Tronto's four phases of care. Evidence for this argument will include statements made by Syngenta, peer-reviewed scientific studies, news articles written on the topic, and risk assessments from the Environmental Protection Agency (EPA).

Background

Atrazine was first created in 1958 and has been used on fields in the United States since 1959. It is used primarily in corn fields to kill broadleaf grasses and weeds at a low cost to farmers. It is estimated that 70 to 80 million pounds of atrazine are used in the United States each

year (Land Stewardship Project & Pesticide Action Network North America, 2010). In 1994, the EPA decided to begin investigating atrazine because it was concerned about the health effects of the chemical. Syngenta hired University of California Berkeley (UC Berkeley) scientist, Tyrone Hayes, in 1997 to conduct research on the effects of atrazine. Hayes largest discovery was that as low as 0.1 part per billion, or 0.0001 mg/L, of atrazine induced hermaphroditism in frogs, which means male frogs grew female sex organs in addition to their male sex organs. Syngenta did not like these results and would not approve of the publication of Hayes' study. For this reason, Hayes quit working for Syngenta, replicated the study on his own, and published the results independently (Aviv, 2014). Hayes' new study found even more alarming discoveries, such as the presence of atrazine on organic farmland and wildlife protection areas that were located adjacent to cornfields. Atrazine was present in locations where it was not applied over two months after the pesticide's application (Hayes et al., 2003). In the years following, greater time and resources have been spent investigating the effects of atrazine. Germany and Italy banned atrazine in 1991, and in 2005 the European Union followed, banning atrazine use for all their member states because it is persistent in groundwater. The EPA has also acknowledged that atrazine is mobile and persistent in the environment, as Hayes' study indicated, but it has never banned the use of atrazine in the United States (Farruggia et al., 2016). Groups such as the Pesticide Action Network, Land Stewardship Project, and the National Resources Defense Council continue to advocate for the discontinuation of atrazine use in the United States.

Literature Review

Many environmental activist groups have written about why atrazine should not be used in the US, but scholars have not adequately considered the production and use of atrazine from an ethical standpoint. I will review two sources, one that discusses general pesticide use using

various ethical principles and another that looks at atrazine use from an economic standpoint evaluating the potential benefits and costs.

In *Environmental Health Ethics*, author David Resnik broadly examines many environmental issues in addition to pesticides, such as genetically modified crops, energy, and pollution, using ethical principles. In his chapter on pest control, he considers how ethical principles of utility, justice, animal welfare, sustainability, and the precautionary principle, can be used to argue for and against pesticide use. However, this argument is limited because it does not specifically consider pesticide producers' duty of care towards people and the environment. Resnik believes the ethical debate surrounding pesticides is a debate on whether no pesticides should be used, or if there should be judicious use of pesticides with regulatory oversight. His conclusion is that judicial use of pesticides is fine if "potential threats to public health and the environment are understood and minimized," (Resnik, 2012) because of the benefits that pesticide use provides. Put simply, his argument is that a pesticide's use is ethical if the benefits outweigh the costs.

In *Poisoned for Pennies: The Economics of Toxics and Precaution*, author Frank Ackerman critiques this simple cost-benefit analysis and argues for a precautionary approach to decision making. One of the chapters of his book focuses on the case of atrazine use. Ackerman acknowledges the contradictory information on atrazine, which is that some researchers believe it is an endocrine disruptor and may be linked to certain cancers, while others argue that the chemical is safe if it is used according to the regulations. Ackerman proposes a precautionary policy making approach for atrazine instead of the cost-benefit approach for a few reasons. In addition to the fact that it is, "difficult or impossible to put prices on the health effects of agricultural chemicals," a "cost-benefit analysis would require a resolution to the ongoing debate about the probability of harm," (Ackerman, 2008). Seeing that debate surrounding atrazine has

gone on for almost three decades now, it will most likely remain unresolved for quite some time. Contemplating economic scenarios related to the potential risks of atrazine, Ackerman considers the scenario that atrazine is banned yet turns out to be harmless. He concludes that if atrazine is safe and banned unnecessarily, the cost of corn would most likely only increase by less than one percent. However, if atrazine is unsafe and is not banned, society "would truly risk being poisoned for pennies," (Ackerman, 2008). Therefore, he believes that atrazine should not be used until we are certain of the risks and other pesticides can be used in the meantime.

Although Resnik uses some ethical principles to analyze pesticide use, his argument is not related to the specific case of atrazine. Ackerman's research considered atrazine in particular, but did not make an ethical judgement on whether Syngenta is acting morally. Neither Ackerman's nor Resnik's arguments consider whether pesticide producers act with care towards the environment and the people who may be affected by their products. My research will address these shortcomings in the scholarship by developing a judgement on the morality of Syngenta's actions surrounding atrazine using the framework of care ethics.

Conceptual Framework

Care ethics is a relevant framework for analyzing the case of atrazine. The framework, inspired by the work of Carol Gilligan, proposes that in order to learn what is good or bad in a particular situation, people need to place themselves in others' shoes to understand others' emotions and needs (van de Poel & Royakkers, 2011). The main idea of this framework is that we have a social responsibility to "maintain, continue, and repair our 'world' so that we can live in it as well as possible. That world includes our bodies, ourselves, and our environment, all of which we seek to interweave in a complex, life-sustaining web," (Fischer & Tronto, 1990). This means people in society are interconnected and are responsible not only for each other's health

and wellbeing, but also for the health and wellbeing of the environment. Additionally, care ethics recognizes that people have different roles in relation to one another, so there are different levels to this duty of care. People closer in relationship to one another have a greater responsibility of care. In relationships where there is a power imbalance, care exhibited by the person in power becomes even more important (Fischer & Tronto, 1990). Care ethics also extends the idea of an individual's duty of care and says that groups, organizations, and companies have a duty of care to people and the environment as well (van de Poel & Royakkers, 2011).

Berenice Fischer and Joan Tronto expanded upon that basic framework of care ethics to propose four stages of care. These stages are attentiveness, responsibility, competence, and responsiveness to care. The first consists of analyzing relationships to see whether there is adequate attentiveness to the needs of the people in the relationship. The second considers whether responsibility has been taken for those needs. The third assesses whether good and successful care to meet those needs has been provided, and the fourth is used to determine whether the people receiving care are able to receive it well (Fischer & Tronto, 1990).

In this paper, I will first demonstrate that Syngenta has a duty of care to the groups of people who use and are affected by its products as well as a duty of care to the environment. Then I will analyze Syngenta's actions through the four criteria presented above: attentiveness, responsibility, competence, and responsiveness to care. By doing so I will show that Syngenta has not acted morally in its continual production and distribution of atrazine.

Analysis

In order to use the framework of care ethics, relationships need to be established between Syngenta and affected groups. Syngenta's most direct relationship is to its customers, as the customers are the people purchasing its products. By extension, Syngenta also has a relationship

with the employees of its customers because the employees are the ones who handle and interact with the product. Furthermore, Syngenta must have a relationship with citizens living in areas surrounding the fields where atrazine is applied because the chemical shows up in those citizens' drinking water (Ivory, 2009).

Syngenta also has a relationship to the environment. The company's product is used in nature on agricultural fields and travels through water as runoff into the surrounding ecosystem. It is impossible to keep a chemical that is mobile and persistent confined to one area, so Syngenta must know that its product will travel into the greater environment. To analyze this case, I will examine Syngenta's actions using the four stages of care first with respect to the environment and then to people.

Environment

First, I will demonstrate that Syngenta did not fulfill its duty of care to the environment. Attentiveness is the foundation of the stages of care model. If people are not aware of others' needs, they cannot take responsibility and respond. In the case of atrazine and the environment, Syngenta must be aware of the needs of the environment. The major need of the environment is the need for ecosystems to be protected. Syngenta is aware of this need because the company goes to great lengths to prove that atrazine is safe and even beneficial to the environment. Syngenta's website gives no credit to any of the environmental risks of atrazine and instead provides information stating that atrazine actually "protects the environment and critical wildlife habitats by reducing up to 85 million tons of soil erosion each year by encouraging conservation tillage and no-fill farming," (Syngenta US, 2021a). This claim is refuted by information released in a biological evaluation of the effects of atrazine conducted by the EPA. The EPA reports that

“atrazine is likely to adversely affect 54 percent of all the species and 40 percent of critical habitats” (US EPA, 2020) that it was evaluating.

It is important to note that adverse effects are likely in more than half of the 1,795 species evaluated, yet Syngenta’s website still holds that its product is safe and even good for the environment. The fact that Syngenta refuses to acknowledge the known and potential risks of its product shows the company is not taking responsibility to meet the needs of the environment.

Furthermore, in trying to prove the safety of its product instead of taking responsibility, Syngenta worked to discredit scientists who proved atrazine has harmful effects on wildlife. After Tyrone Hayes quit working for Syngenta and published his results on the harmful effects of atrazine in frogs on his own, Syngenta launched a campaign to discredit Hayes and produced scientific studies that would contradict his results related to the effects on the reproductive organs of frogs. Once these Syngenta sponsored studies that generated conflicting evidence were published, atrazine use could not be as easily restricted because there was not enough evidence that the original results were reproducible. However, these new Syngenta sponsored studies were found to have many problems such as contaminated controls, high mortality of frogs, or both. Yet, the other studies conducted by Hayes and Reeder et al. in field and laboratory settings did find adverse effects on the frogs’ reproductive organs (Hayes, 2004). It is important to note that Syngenta could have acknowledged Hayes' original results and decided to take them seriously. Syngenta could have taken responsibility to meet the need of environmental protection, but instead the company paid scientists to conduct studies with issues such as inadequate design in order to generate confusion and delay the regulatory process due to inconclusive results.

In addition to generating contradictory studies, Syngenta spent millions of dollars to reshape the narrative surrounding atrazine. Syngenta had a list of “supportive third-party stakeholders” that it paid to publish pro-atrazine content. Documents released in a lawsuit against

Syngenta showed that "people on the list were coached, their statements in support of atrazine were edited by the company, and payments to them were not publicly disclosed" (Howard, 2013). This means that Syngenta secretly paid third parties to write articles in support of atrazine, the chemical that is known to have adverse health effects in wildlife and is a persistent contaminant in the environment. Again, instead of taking responsibility for the needs of the environment, Syngenta decided to direct a significant number of resources towards supporting a product with harmful effects in order to protect its revenue.

Because Syngenta did not take responsibility for the needs of the environment, competence of care and responsiveness to care cannot be evaluated. Therefore, since Syngenta only recognized the need for environmental protection but did not take action to meet that need, it did not and is not acting ethically towards the environment by continuing to produce and distribute atrazine.

People

Next, I will demonstrate that Syngenta is not fulfilling its duty of care to the people who purchase, use, and come in contact with atrazine through the environment. On the main web page of Atrazine.com, Syngenta states that "atrazine is effective, safe, and integral to agriculture's success in the United States and worldwide" (Syngenta US, 2021a), which shows that the company is aware its customers want the product they purchase to be effective and safe. This is the first stage of care, attentiveness. In addition to the need for a safe and effective product, Syngenta is also aware that customers want an inexpensive product. Cost efficiency is one of the benefits of atrazine listed on Syngenta's website. Syngenta proposes that atrazine saves U.S. customers $3.6 to $4.4 billion each year (Syngenta US, 2021c). Consequently, the first stage of care is met because Syngenta knows what its customers need.

The second stage of care is responsibility, which, in this case, requires Syngenta to take responsibility for people's needs. Syngenta is easily taking care of the needs for an effective and cost-efficient product, but the company falls short on meeting the need of a safe product. Some peer-reviewed studies on atrazine have found that "birth defect rates in the United States were highest for women who conceived during months when atrazine levels were spiking" and that atrazine "may be harmful, particularly to developing fetuses, in doses as low as 0.1 ppb," (Ivory, 2009). Knowing Syngenta has tried to diminish scientific results it disagrees with related to atrazine's effects on frogs, it makes sense that the company would act similarly in this situation. A Syngenta-sponsored study was published evaluating the results of 22 scientific studies on this subject and stated, "conclusions about a causal link between atrazine and adverse pregnancy outcomes are not warranted" (Goodman et al., 2014). Again, even if a causal link cannot be established that does not mean Syngenta can just ignore the results of this group of studies. Instead of caring for the people it is in relationship with and taking responsibility for the need of safety, the company continues to produce and distribute its product.

Americans have recognized that Syngenta needs to take responsibility for atrazine appearing in places it does not belong. In 2004, the Holiday Shores Sanitary District filed a lawsuit against Syngenta to try and force the company to cover the cost of removing atrazine from drinking water in Edwardsville, IL. The case became a class action lawsuit as many other municipalities joined. After eight years of litigation, Syngenta finally agreed to settle and pay $105 million to help cover filtration costs for more than 1,000 community water systems across six midwestern states (Howard, 2013). One important thing to note is the number of cities across multiple states that have atrazine in their drinking water supply. Another is the fact that Syngenta settled and agreed to pay millions of dollars. However, the company continues to hold the position that it is not "physically possible to dissolve enough atrazine in water to have any impact

on hormones or human health," (Syngenta US, 2021b). This shows that Syngenta believes its product is safe, or at least wants people to think that is what they believe. In this case of the class action lawsuit, it could be argued that Syngenta took responsibility for peoples' need to have clean drinking water and provided care in that the company paid to help remove atrazine from drinking water. However, in the settlement it is written that the "defendants expressly deny any liability," (*City of Greenville et al. Vs. Syngenta Crop Protection Inc. And Syngenta AG*, 2012), so Syngenta did not actually take responsibility for its actions. Instead, it seems Syngenta was just trying to put an end to a very time-consuming and costly litigation. Therefore, Syngenta once again has recognized others' needs, but has not taken responsibility for those needs or provided good care to mitigate potential risks and harm.

Lastly, Syngenta has not protected people in asymmetrical relationships of power. This company, which makes almost $14 billion in sales each year (Syngenta Global, 2020), has more power and resources than its customers and significantly more power than farmworkers who interact with atrazine during its application. Due to this power imbalance, Syngenta has an even greater duty to provide care. Yet as I have shown, Syngenta has not provided adequate care to the groups of people it is in relationship with. Therefore, because Syngenta is not protecting these groups and individuals with significantly less power, the immorality of Syngenta's actions in continuing to produce and distribute atrazine is even greater.

Although it seems that from the framework of care ethics Syngenta's actions are unethical, Syngenta maintains that it has not done anything unethical in the process of producing and promoting atrazine. In an atrazine FAQ document, Syngenta wrote, "while we have engaged in campaigns to promote the safety of atrazine and the sound science that supports its registration, our employees have always conducted themselves with the highest ethical standards," (Syngenta US, n.d.). However, in addition to just producing inadequately designed

research studies to divert attention from Hayes' research, the company also tried to discredit him as a person. Following the settlement of the class action lawsuit against Syngenta, numerous company documents, emails, and memos were released. Notes were found in these documents that showed Syngenta's public relations team had aimed to find a way to reveal Hayes as non-credible. Syngenta's communications manager specifically wrote that, "If TH involved in scandal, enviros will drop him," and that the company should look for "ways to "exploit Hayes' faults/problems"," (Aviv, 2014). Acting upon the ideas in these notes, Syngenta filed an ethics complaint about Hayes with UC Berkeley, delivered "personal attacks intended to exploit the "imposter syndrome," to undermine his confidence," and made threats against Hayes' family among other things (Ogburn, 2016). This evidence directly refutes Syngenta's claims that the company did not behave immorally in promoting its product. Instead of caring for Hayes' need for psychological safety, the company threatened his family and made him feel paranoid, like someone was always out to get him. Therefore, it cannot be concluded that Syngenta acted ethically in producing, distributing, and promoting atrazine.

Conclusion

With all the evidence presented, it has been shown that Syngenta acted unethically from the standpoint of care ethics. Syngenta did not carry out its duty of care to people or to the environment. This duty of care broke down when Syngenta failed to take responsibility for the harms that atrazine has on the environment as well as possible harms related to birth defects in humans. Not only did Syngenta not take responsibility for its actions to meet others' needs, the company insists that atrazine is not harmful whatsoever and is actually beneficial to the environment. Furthermore, Syngenta launched a personal attack on Hayes, a scientist the company used to employ, threatening him and making him feel unsafe in order to maintain the

good reputation of its product. Considering the morality of pesticide producers, such as Syngenta, can provide insight into decision making that science alone will not provide. The conclusion that Syngenta acted unethically is significant because it shows that Syngenta cannot be trusted to meet the need for a safe product for people and the environment. Knowledge gained from this research and conclusion can be considered when future decisions are made regarding whether certain pesticides should be utilized or banned. In order to have a society where the needs of environmental and human health are met with competence, it is necessary to be aware of the ethics and intentions of those in power, not just the science.

References

Ackerman, F. (2008). *Poisoned for pennies: The economics of toxics and precaution* (Illustrated edition). Island Press.

Aviv, R. (2014, February 2). *A valuable reputation*. The New Yorker. https://www.newyorker.com/magazine/2014/02/10/a-valuable-reputation

Farruggia, F., Rossmeisl, C., Hetrick, J., Biscoe, M., Louie-Juzwiak, R., & Spatz, D. (2016). *Refined ecological risk assessment for atrazine*. 520.

Fischer, B., & Tronto, J. (1990). Toward a feminist theory of caring. In E. K. Abel & M. K. Nelson (Eds.), *Circles of care: Work and identity in women's lives*. SUNY Press.

Goodman, M., Mandel, J. S., DeSesso, J. M., & Scialli, A. R. (2014). Atrazine and pregnancy outcomes: A systematic review of epidemiologic evidence. *Birth Defects Research Part b: Developmental and Reproductive Toxicology*, *101*(3), 215–236. https://doi.org/10.1002/bdrb.21101

Hayes, T. B. (2004). There is no denying this: Defusing the confusion about atrazine. *BioScience*, *54*(12), 1138–1149. https://doi.org/10.1641/0006-3568(2004)054[1138:TINDTD]2.0.CO;2

Hayes, T., Haston, K., Tsui, M., Anhthu Hoang, Haeffele, C., & Vonk, A. (2003). Atrazine-induced hermaphroditism at 0.1 ppb in American leopard frogs (Rana pipeniens): Laboratory and field evidence. *Environmental Health Perspectives*, *111*(4), 568. https://doi.org/10.1289/ehp.5932

Howard, C. (2013, June 17). Pest control: Syngenta's secret campaign to discredit atrazine's critics. *100Reporters*. https://100r.org/2013/06/pest-control-syngentas-secret-campaign-to-discredit-atrazines-critics/

Ivory, D. (2009, November 4). *EPA fails to inform public about weed-killer in drinking water (VIDEO)*. HuffPost. https://www.huffpost.com/entry/epa-fails-to-inform-publi_n_266686

Land Stewardship Project, & Pesticide Action Network North America. (2010). *The Syngenta corporation & atrazine: The cost to the land, people, and democracy*. https://www.panna.org/sites/default/files/AtrazineReportBig2010.pdf

Ogburn, J. (2016, November 15). *Biologist uses media, rhyme to resist pressure over his findings*. Duke University Sanford School of Public Policy. https://sanford.duke.edu/articles/biologist-uses-media-rhyme-resist-pressure-over-his-findings

Resnik, D. B. (2012). *Environmental health ethics*. Cambridge University Press. http://ebookcentral.proquest.com/lib/uva/detail.action?docID=907175

Syngenta Global. (2020, February 14). *2019 Full year results*. Syngenta. https://www.syngenta.com/en/company/media/syngenta-news/year/2020/2019-full-year-results

Syngenta US. (n.d.). *Atrazine frequently asked questions*. Retrieved March 12, 2021, from https://www.syngentaebiz.com/mediamanager/ImageHandler.ashx?ImID=26d89c72-c34e-4eac-aa6d-5874e36d9d25&fTy=0&r=69d2852b-13b1-41bc-a1ef-9affc32edafe&et=8&t=0

Syngenta US. (2021a). *Atrazine herbicide*. Atrazine. https://www.atrazine.com/atramain.aspx

Syngenta US. (2021b). *Health effects of atrazine on human health*. Atrazine. https://www.atrazine.com/human-health.aspx

Syngenta US. (2021c). *The benefits of atrazine: Cost efficient*. Atrazine. https://www.atrazine.com/benefits/benefits-of-atrazine-cost-efficient.aspx

City of Greenville et al. Vs. Syngenta Crop Protection Inc. And Syngenta AG, (US District Court May 24, 2012). https://www.circleofblue.org/wp-content/uploads/2012/05/Atrazine-Proposed-Settlement.pdf

US EPA. (2020, November 5). *EPA releases draft biological evaluations for atrazine, simazine and propazine* [Overviews and Factsheets]. US EPA. https://www.epa.gov/pesticides/epa-releases-draft-biological-evaluations-atrazine-simazine-and-propazine

van de Poel, I., & Royakkers, L. M. M. (2011). *Ethics, technology, and engineering: An introduction*. Wiley-Blackwell.