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Rethinking ownership of genetically modified seeds

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Abstract: Ownership is an important tenant of societies; it can be studied as a legal notion, a psychological one, or an anthropological one. In the context of new technological developments, ownership becomes important in terms of determining access, and sharing benefits and responsibilities. In the recent years, field of ethics for technology and notion of moral responsibility for risks have developed rapidly. When one considers use of biotechnology in agriculture, two main debates stand out—concerning risks and ownerships. This paper discusses a new way to conceive ownership anchored on ethics of technology and on practical philosophy literature, and points out moral responsibility of owners for stopping uncertain risks of genetically modified (GM) seeds. Doing so would allow an understanding of different narratives around GM seeds and would pinpoint observations morally desirable when risks are to be dealt with.

Keywords: Risks, Ownership, Genetically Modified Seeds, Experimentation, Rights

Ownership is an important tenant of societies; it can be studied as a legal notion, a psychological one, or an anthropological one. In the context of new technological developments, ownership becomes important in terms of determining access, and sharing benefits and responsibilities. In the recent years, field of ethics for technology and notion of moral responsibility for risks have developed rapidly. When one considers use of biotechnology in agriculture, two main debates stand out-concerning risks and ownership. This paper discusses a new way to conceive ownership anchored on ethics of technology and on practical philosophy literature, and points out moral responsibility of owners for stopping uncertain risks of genetically modified (GM) seeds. Doing so would allow understanding of different narratives

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Experimenting with GM Seeds

Debates around genetically modified seeds have been taking place for more than a decade (Wynne, 2001), yet they seem far from being resolved. Controversies live on, and might be reignited with the advent of gene editing and new breeding techniques. This enduring controversy has created a rift in regulations, for instance between the US and the European Union (Ramjoué, 2007). This had implications in the developments of GM seeds—for instance, strict European regulations drove some agro-chemical companies to move their research and development outside the Europe (Laursen, 2012).

While GM seeds can pass through the existing regulatory risk assessments of many countries, but their focus often is on the technical aspects of assessments. Uncertain risks, including societal risks, are not always addressed in assessments. Regulations can, therefore, be considered a field of experimentation (Millo and Lezaun 2006; Levidow and Carr 2007), as dealing with uncertain risks is a challenge to regulatory institutions (van Asselt and Vos, 2008).

Possible approaches to deal with the risks are: cost: benefit analyses, precautionary principle, and labelling (Thompson, 2007). For each of these approaches, objections can be voiced. Cost-benefit analyses deal with known risks only; the precautionary principle presents multiple interpretations (Sunstein, 2003) and labelling is problematic when one considers asymmetries found in the situations of informed consent (Spruit *et al.,* 2016). Adaptive management and participatory technology assessment are other ways of dealing with uncertainties but they have their own limitations (Robaey and Simons, 2015).

In the world's recent history with new technologies, There are examples of Beck's 'Risk Society' (1992), where new technologies had major unintended negative impact such as Fukushima. Engineering decisions create socio -technical systems, of which possible consequences are not always easy to predict.

Just as the ethics brought positive change to the practice of medicine after the horror of the World War II, they can also provide a constructive

framework for dealing with the introduction of new technologies in the society, which can benefit the society, such as GM seeds; but at the same time can bring in much controversy because of uncertain risks. Just as ethics brought a notion of professional responsibility to the medical world, the ethics of engineering brings in opportunities to define responsibility for a complex socio-technical system, such as the one of GM seeds.

Before continuing with the next section, it is worth noting what can be considered as uncertain risks of GM seeds. It is fair to say that according to the most risk assessments, GMOs are not risky. It is also fair to say that agriculture, no matter which technology it employs, is experimental when it comes to taming nature. The question is how we choose to tame life and how much we would know about it in the long run. This is one of the streams of argument where civil society opposes GM seeds by. Another stream of argument is how this choice of technology would affect the way our society is organized, shares benefits and risks and changes farming practices. It seems that while innovations in biotechnology are fast moving, social and legal innovations are moving comparatively slower. The current system creates a lot of discontent as is seen by the civil society resistance and scepticism (for example see ETC 2014). So when referring to uncertain risks of GM seeds in this paper, they encompass natural and physical as well as social, economical and cultural events.

Who is responsible for GM seeds?

Recent developments in the field of ethics for technology can shed some light on how this responsibility can be implemented. Van de Poel (2013, 2016) has suggested looking at the introduction of new technologies as a social experiment, with the idea that by slowly scaling up, there is time to learn about new technology in its context and to adjust to different mechanisms. Typically, new technologies with great potential benefits and also with great potential consequences are subject to this framework, such as GM seeds. Van de Poel has suggested a set of conditions that make such a social experiment morally responsible.

One of the conditions for responsible experimentation according to van de Poel (2013, 2016) is the fair distribution of risks and benefits. In this paper, the focus is on the distribution of risks and uncertain risks. However,

uncertain risks and known risks cannot be distributed but benefits can be. Uncertain risks and known risks are bound to a certain time and a place of occurrence. What can be distributed, however, are moral responsibilities to different actors involved in the social experiment – the ones who take the risks. The distribution of uncertain risks can be rephrased as the distribution of moral responsibilities for uncertain risks.

Who are the ones who take risks? The typical journey of a GM seed is as follows:- 1) research and development in a laboratory in the private sector, or at a university, 2) securing intellectual property rights on the GM seed (for instance see Jefferson *et al*., 2015 on how patents play out in agriculture), 3) go through a regulatory process, including a risk assessment, 4) commercialization to farmers, and 5) harvest and distribution. So in a way, all these actors share risk-taking by participating in the social experiment, as defined by Van de Poel.

The social experiment, however, begins most of the time in a private realm. The protection of GM seeds through patents is typically seen as a drive for innovation. In addition, patents are a legal instrument used to control distribution of economic benefits. This is especially true for GM seeds. Indeed, Buttel and Belsky pointed out that "Intellectual property statutes enable an individual seed company to develop new knowledge and products that can be denied to competitors. Thus, a seed company will have a greater incentive to develop new plant varieties than would otherwise be the case if there were no intellectual property restrictions" (p.32, 1987). Objections are since then found in the literature (*see* for instance Timmerman, 2015). Buttel and Belsky also underlined that commercial and private nature of this enterprise requires ethical and socio-economic assessment. At present, such assessment is not implemented in a way that would bear impact on the society. Baumgartner (2006) argued that, in the European context, the ethical concerns only look at the invention itself, and not at the invention in its context. So the patent application does not take into account how farming is organized, how benefits and risks are shared, and how an invention may change farming practices.

So it seems that of all the people involved in the journey of a GM seed, starting with those who control distribution of benefits is a good way to start investigating distribution of moral responsibilities for uncertain risks. This

does not exclude other actors such as regulators or citizens from further analysis, but for the scope of this paper, the focus is on every owners.

Owning GM seeds

Before continuing, let it be clear that what this paper means regarding ownership and what the ownership is on exactly.

In *Notes and Queries on Anthropology* ownership is defined as the "sum total of rights which various persons or groups of persons have over things; the things thus owned are property" (1967, 148-9). This is a constructive notion of ownership. Legal scholar Honoré, describes ownership in a similar way, as a bundle of rights. Honoré (1961) presents ownership as a bundle of rights, with a list going from the 'right to income' to the 'right to exclude'. An important element of Honoré's approach is split ownership; how one object and its copies can be owned to different extents. So owner A might have all the rights on an artefact, and owner B might only have a few of the rights, and some of the rights might be shared, like the right to use. Together, owner A and owner B have a split ownership on the artefact. More specifically, if one of the rights of owner A was the right to lease to owner B, then owner B would have the right to use, and to have income from use perhaps, but no other rights such as exclusion. In this paper, an owner is, therefore, any person granted certain rights on the seed. Understanding ownership in a broader sense than that of patents allows conceiving ownership as a relation between people and things.

To summarize: the focus is on owners because owners are risk-takers (and benefits winners). Considering ownership only as patents is limiting when thinking of distributing moral responsibilities, so a constructive understanding of ownership has been taken, which allows broader analysis.

What do owners own then? In the case of a patent, this is clearly defined: a certain process and its outcomes are owned. If the notion of ownership is broadened, what is owned precisely? Koepsell (2009) uses the type/token distinction from philosophy of language and extends it to human genes. He explains that the type is an original idea, and that tokens of a type are physical reproductions of the type. For instance, the story and the words *Harry Potter* is a type, and every printed book of *Harry Potter* is a token. Extending this analysis to the case of seeds means that the idea of a new

seed with particular properties (like the story) and the process to get there (like the words) are the type and the physical results, the GM seeds (like the books) are the tokens. The analysis of distributing moral responsibility for owners is, therefore, applied to tokens, i.e. the GM seeds.

With these distinctions in mind, the following section presents a proposal for understanding moral responsibility of owners for GM seeds in the social experiment.

Moral responsibility of owners

In the field of ethics, this is a remarkably under-developed topic of research. The following framework is a moral one, and not a legal one. Elements of this moral framework may be under implementation in the existing regulations around the world. There is thus a level of abstraction required from the reader. These moral considerations would be put in context in the next section.

Honoré speaks of a 'duty to do no harm' as one of the elements to a bundle of property rights (Honoré, 1961). Duties are a form of forward-looking moral responsibility, meaning a responsibility for potential harms, which have not yet happened, or in other words a responsibility to see to it that a certain state of affairs happens. This contrasts with backward-looking moral responsibility, which aims to establish blame or praise for an event that has already happened (van de Poel *et al.* 2015); this is not the focus of this paper. According to Goodin (1986), a duty prescribes a specific action to a specific agent (or owner) for a specific goal. This seems appropriate for dealing with known risks, as in, an agent A (or owner) should do X to prevent *i*. Earlier in this text, our attention was brought to uncertain risks, which were also the object of controversy. The notion of duty is insufficient to deal with uncertain risks, since it is unclear what an agent (or owner) A should do to prevent an uncertain-*i*. Using Goodin's (1986) definition of responsibility becomes relevant to this framework. Indeed, if the desired goal is *y*, where *y* is an open state of affairs where no harm is done. So owners also have a responsibility to do no harm. Then an agent A (or owner) must be able to learn about a situation to react and decide on how best to reach *y*. The way how to do this remains onthe discretion of the agent (or owner). In other words, to be responsible, an owner needs to learn to be able to decide on what actions should betaken to reach desired consequences.

When planting a new seed, owners need to learn about its impact, and observe what changes are occurring in a natural way and also in a social way. This would allow identifying where unintended and undesirable outcomes may arise. In turn, this would allow taking necessary actions to maximize positive outcomes from their use and minimize the negative ones.

Owners have moral responsibility for desirable outcomes from the use of seeds, and they must learn about it. One way to understand the idea of learning in ethics is to speak of the development of epistemic virtues, i.e. the character traits that would make someone a good learner. Examples of these traits or virtues are impartiality, intellectual courage and community (Montmarquet, 1987). In this framework, moral responsibility can, therefore, be understood at the moral responsibility to cultivate epistemic virtues.

Using this definition has two advantages. First, it does not limit moral responsibility to what is known already, but it expands moral responsibility for what remains to be known. Second, given that virtues are at the individual level, they also embrace the context of the individual. For instance, intellectual courage would not result same actions for a scientist or for a farmer, but both can develop this virtue. Through this, cultivating virtues allow owners to defining a range of actions they can learn about the GM seed being developed or used.

There remains one important question: if ownership is something that can be acquired and transferred, how can responsibilities be acquired and transferred? In other works, a detailed account of what makesup a good transfer of moral responsibilities has been presented by Robaey (2016b). For the purpose of this paper, the focus shall be on the main ingredient of a desirable transfer of moral responsibility: epistemic access, or the access to knowledge about the technology. To be responsible experimenting owners, having access to knowledge about the GM seed is important. This includes capacity to change it and to communicate it with other owners about the new knowledge acquired. This also includes cooperation among different owners —the ones who do research and development, the ones who commercialize the seed, and the ones who use it, the farmers. Here cooperation suggests that owners with more capacity to learn should support other owners in their learning.

All in all, having access to knowledge, and being able to develop one's knowledge is an essential condition to being responsible for GM seeds.

Many possible narratives for genetic modifications

In this paper, rethinking has been suggested on the idea of ownership for GM seeds, from a moral perspective. A set of ideas has been presented to apply to all GM seeds, keeping in mind that not all GM seeds are equal in their risk, social and environmental assessments. Each type of modification on seeds deserves an assessment of its own. The proposed framework does not have concern for this assessment, rather, it is concerned with how responsibilities can be discussed and distributed for GM seeds; given their uncertain risks. The proposed framework suggests that access to knowledge and cooperation are primordial to a desirable introduction of GM seeds. This framework was developed looking for a constructive way to discuss use of GM seeds to move beyond the usual stalemates. What such a framework suggests, practically, is that owners, regulators and citizens can make different decisions.

The cases that triggered reflection on this framework are for instance the one of Monsanto Canada vs. Percy Schmeiser. After this framework was developed, the case of *Bt* Brinjal in Bangladesh became internationally more prominent. These two stories offer an interesting reflection on choices to be made—both cases feature GM seeds but the conditions in which responsibilities and benefits are shared differ tremendously. Let us compare the two narratives[1] around the use of genetic modification in agriculture: Bt Brinjal in Bangladesh and Round -Up Ready Canola in Canada (the case of the lawsuit Monsanto Canada vs Percy Schmeiser). Considering these two cases show how socio-technical systems around GM seeds can be conceived of differently.

Almost two decades ago, the case of Round-Up Canola in Canada made headlines because a Canadian farmer Percy Schmeiser was replanting Round-Up Canola seeds harvested from his field, which he claimed he was not aware of. This resulted in a patent infringement case for the company who owned Round-Up Canola, Monsanto. A few years later, this was also settled in court as a case of contamination where Monsanto paid fees to clean- up the field of Percy Schmeiser. Here, the issue of ownership was

determined by the law and by the courts. Percy Schmeiser claimed he did not know about the Round-Up ready seeds in his field. This was largely discredited during the lawsuit by prosecution.

Here, the notion of ownership is limited to the company owning the patent. What we can learn from this is that if the owner had a responsibility to avoid harm, measures would have been taken to prevent contamination. The later lawsuit showed that there was a measure of blame for the contamination as Monsanto had to bear the costs. This case has also given a clearer meaning to the idea of uncertain risks. Who was to know that Percy Schmeiser's field would be contaminated? The costs of the lawsuit, the clean-up, loss of trust in a company and its seeds were all unintended and undesirable harms resulted from the use of a GM seed.

Had there been a different set- up in the distribution of rights and responsibilities, these costs might have been avoided.

Let us now come to more recent times, and to another part of the world to look at *Bt* Brinjal. *Bt* Brinjal is a modified eggplant in which farmer has to use less pesticides as plant itself contains a gene that when expressed, targets specific pests. In 2013, four varieties of *Bt* Brinjal were approved in Bangladesh and were given to 20 farmers (out of 150,000 brinjal farmers in Bangladesh) in four regions with a total of two hectares of the crop (out of 50,000 hectares of brinjal in Bangladesh) (Choudary *et al.* 2014).The Bt technology was donated to the Bangladesh Agricultural Research Institute (BARI) by the Indian biotechnology company Mahyco and the transfer was supported by the USAID and Cornell University (ibid.). The Mahyco has entered a joint venture with Monsanto for *Bt* cotton more than 20 years ago.

Who is an owner? Part of what makes the case unusual is that here GM seeds are indeed owned by multiple actors at the same time, and without the patent controversy as the *Bt* technology was donated to a public research institute, and the seeds were given to farmers. According to a journalistic account of the case (Boersma *et al.,* 2017), farmer can keep and re-use seeds, may be even continue breeding them.

How is the responsibility to do no harm shared? According to Choudary *et al.* (2014), the condition for the release of *Bt* Brinjal stipulates training of farmers in terms of biosafety and the use of several other biosafety measures. The journalistic account (Boersma *et al.* 2017) indicates how small resource

farmers who normally hand-sprayed their fields with pesticides were able to reduce use of pesticides on *Bt* Brinjal.The BARI is also setting up biosafety plan and organizing measures and monitoring. It seems that from a regulatory perspective, responsibility is distributed. Also farmers reported to have visited BARI several times (Choudary *et al.* 2014). From these first impressions, it seems that the way Bangladesh introduced *Bt* Brinjal, meets many of the requirements of the above framework.

Of course, similar tests, training and scaling up have taken place in Canada also. The difference is who owns GM seeds and this has implications for potential harms at a social and an economical level.

While Bt Brinjal remains controversial[1], it shows another kind of set -up for using GM seeds, where the focus is not on the patent infringements, but rather on a continued collaborative development of seeds between researchers and farmers, without barriers on access to seeds.

Conclusion

To conclude, I would like to refer to Asveld's framework on governing by experimentation (2016) where she argues that three types of learning have to happen. Learning about impacts, which involve monitoring and learning about positive and negative impacts. Institutional learning involves setting use of a technology into a broader societal goal and seeing how this or other technologies may help reaching that goal. This can also involve hearing and integrating dissenting voices, and considering alternatives. And last but not the least, there needs to be a moral learning about what values are behind their project and how these are justified, and perhaps how these might involve trade-offs.

How we conceive ownership, where we put priorities in the development of our seeds, and how we understand moral responsibility is an issue that pertains to all three types of learnings. Considering the cases of Canada and Bangladesh, it can be observed that making decisions on these institutional issues can greatly influence governance of GM seeds.

Note: It is important to note that all the information provided is from desk research only and is in no way representative of empirical work on the field.

Endnote

1 A first controversy is one of biopiracy in India (Abdelgawad, 2012), another one is on the involvement of foreign actors such as the USAID and Cornell University in Bangladesh and a last one revolves around the proper identification of risks (GM Watch, 2016). Some recurring themes appear in these controversies: ownership and risks.

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