

# Plant Genetic Resources:

Restoring the Common Heritage of Humankind

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Principles of Earth Jurisprudence

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Wendell Berry wrote an article titled *The Whole Horse: The Preservation of the Agrarian Mind* in which he describes a society that is separated from its history, alienated from that which should be giving guidance to a new generation. Berry describes a system where it is virtually impossible for consumers to know the economic history or ecological cost of the products they buy. He also suggests that it is in the best interest of the agricultural industry to keep these histories and costs unknown.<sup>1</sup>

Articles such as *The Whole Horse* are meant to encourage a break from the social constructs that make up the paradigm within which society is housed. Seemingly simple questions like “Where does this produce come from?” and “How it is grown?” should be taught to, and not shielded from, the general public. The iconic image of the American farmer is ingrained in the minds of the American public across the country. In this modern age, the American farmer has undergone such dramatic changes that the public would do well to be reintroduced to the state of farming and the agricultural industry in order that it may explore some of the moral and ethical issues that subtly impact a substantial aspect of modern society.<sup>2</sup>

The agricultural industry and modern farming would not be as they are today without Plant Genetic Resources (“PGRs”) that were cultivated throughout the history of humankind. Much of the biodiversity that has proven useful in modern society is a result of the collective efforts of humankind for the common good. This comment will explore the history of PGR treatment and argue that because PGRs are a collective product of humankind, the rights to PRGs should be protected by society for the sake of society. Additionally, this comment will employ principles of Earth Jurisprudence as moral guidelines for restructuring the current legal regime.

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<sup>1</sup> Wendell Berry, *The Whole Horse: The Preservation of the Agrarian Mind*, in *The Fatal Harvest Reader: The Tragedy of Industrial Agriculture* 39, 40 (Andrew Kimbrell ed., Island Press 2002).

<sup>2</sup> Keith Aoki, *Seeds of Dispute: Intellectual-Property Rights and Agricultural Biodiversity*, 3 *Golden Gate U. Envtl. L. J.* 79, 82 (2009).

For example, one way to protect these resources is through the synthesis of two principles: the public trust doctrine and a more modern proposal put forth by the Convention for Biological Diversity supporting national stewardship of PGRs.

Humankind spent the predominant part of existence as hunter-gatherers: roughly 290,000 years.<sup>3</sup> That is not to say that hunter-gatherer peoples did not make use of agriculture at all. There is evidence to suggest that hunter-gatherers utilized proto-agricultural practices like raising tobacco and grains; however, these early peoples did not cultivate the crops or build societies supported by the yields of these plants.<sup>4</sup> Anthropologists estimate that true agricultural societies began to sprout up about 10,000 years ago, standing apart from the proto-agricultural practices of the hunter-gatherer peoples because the development of higher-yielding crops allowed for permanent settlement supported by stable agricultural production.<sup>5</sup>

Humans could not ensure stable agricultural production until the process of domestication developed higher yielding individual plants. Domestication is the “human-driven evolution” of crops, where human selection and ingenuity visibly and irreversibly change the plants’ genes.<sup>6</sup> Domestication is a deliberate process, not one of happenstance. Domestication purportedly began along the Euphrates River in the Middle East around 9,600 years ago.<sup>7</sup> Scientists believe that early farmers throughout the river plains discovered that crossing two distinct types of wheat, einkora and emmer, produced a plumper, larger grain. Teams of anthropologists have uncovered the hybrid wheat plant in camps and settlements throughout the region.<sup>8</sup>

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<sup>3</sup> Richard Manning, *Against the Grain*, 18 (Rebecca Saletan ed., North Point Press 2005) (2004).

<sup>4</sup> *Id.* at 25 (explaining that nomadic Plains Indians planted tobacco crops for later consumption but left the plants to pursue the hunt, while leaving a small party to tend the crop.)

<sup>5</sup> *Id.* at 18.

<sup>6</sup> *Id.* at 26.

<sup>7</sup> *Id.*

<sup>8</sup> *Id.*

Humankind deliberately domesticated certain crops; however, it has also been argued that the ability to be domesticated was an evolutionary strategy on the part of plants by evolving certain traits that humans find desirable.<sup>9</sup> It is no coincidence that the bulk of human nutrition comes from four classic cash crops: corn, wheat, rice and potatoes.<sup>10</sup> These plants are easily domesticated; some even describe these particular plants as having a predisposition for domestication.<sup>11</sup> Nevertheless, human intervention was the necessary component that fueled widespread cultivation.

For example, maize, or corn, began its march on the world as *tiosinte*, a central Mexican grass.<sup>12</sup> *Tiosinte* has a tall, thin stalk with a little pod casing at the end made up of overlapping glumes. The pods were similar in size to a Cattail or a pinky finger.<sup>13</sup> Inside the pod, housed by the glumes, were two little kernels.<sup>14</sup> At some point, a genetic mutation occurred in a few *tiosinte* plants causing the glumes to shrink; consequently, the two kernels were left exposed.<sup>15</sup> These mutated plants were desirable to hunter-gatherers practicing proto-agriculture because the kernels were easier to access, eat and plant. The mutated seeds were sown in order to produce more plants with the preferable genetic trait.<sup>16</sup> The process of selection was repeated to encourage greater yielding plants with more desirable qualities and eventually the grass turned into what we know as maize.<sup>17</sup>

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<sup>9</sup> Michael Pollan, *The Omnivore's Dilemma*. 2006 at 23, 24 (suggesting that the "invention" of agriculture could be attributed to plants as much as humans because certain plants evolved to have particularly desirable characteristics that appealed to humans. Humans, therefore, manipulated the landscape to create ideal habitats for these certain varieties of plants.)

<sup>10</sup> Manning, *supra* note 3 at 24.

<sup>11</sup> *Id.*

<sup>12</sup> Tom Standage, *An Edible History of Humanity* 5 (Walker Publishing Co. 2009).

<sup>13</sup> *Id.*

<sup>14</sup> *Id.*

<sup>15</sup> *Id.*

<sup>16</sup> *Id.*

<sup>17</sup> Standage, *supra* note 12 at 7 (explaining that with the development of higher yielding individual plants came a host of structural problems, such as, the stalk of the plant could no longer support the ear, and the exposed kernels

Whether it is maize, wheat, rice, or potatoes, the fact is that nature played a leading role in creating PGRs and humankind worked in tandem to manipulate them. Virtually none of the staple crops would exist as we know them without both players. Today, the argument boils down to property law and the right to ownership. Tom Standage, who wrote *An Edible History of Humanity*, notes, “Herbicide-tolerant maize does not occur in nature, it is true—but nor does any other kind of maize.”<sup>18</sup> There is no question that modern society reaps the benefit from the same crops cultivated and coveted by ancestral humans’ common efforts to attain a more plentiful and desirable yield. These efforts were carried out with no expectation of ownership, claim of right or dominion. How is it that the very PGRs that define the majority of modern civilizations have been commoditized and stripped from the common heritage of humankind?

Essentially, the development of PGRs can be broken down into four eras, which can be distinguished by the size and political influence of the seed industry and how society viewed and treated seed germplasm (the part of the plant which is specifically modified, as opposed to the general term PGR).<sup>19</sup>

In the first era, America was a colonial entity and the roots of our agrarian society were being sown. During this era, plants generally were seen as national property, not capable of being particularly owned by anyone.<sup>20</sup> The types of seed breeding methods employed during this era were no more sophisticated than the breeding methods used by Neolithic ancestors.<sup>21</sup>

The second era started around 1862 with the establishment of the United States Department of Agriculture (“USDA”) along with land-grant agricultural universities created

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were vulnerable to the elements as well as other animals. As a result, the process of selection was concerned with altering other traits as well.)

<sup>18</sup> *Id.* at 27.

<sup>19</sup> Aoki, *supra* note 2 at 128.

<sup>20</sup> *Id.*; see also, Keith Aoki, *Weeds, Seeds & Deeds: Recent Skirmishes in the Seed Wars*, 11 *Cardozo J. Int’l & Comp. L.* 247, 266 (2003).

<sup>21</sup> Aoki, *supra* note 20, at 266.

under the Morrill Act of 1862.<sup>22</sup> The USDA worked with farmers and plant breeders from the land-grant universities to encourage the widespread experimentation with, and distribution of, germplasm.<sup>23</sup> At this time, the USDA was mailing successfully bred seeds to farmers across the nation in order diversify the crop and to help distribute seeds adapted to certain soils, climates, and pests.<sup>24</sup> By this time, seeds were still seen, by and large, as national property that no one person could truly own.<sup>25</sup>

The third era evolved out of the 1860s when seed breeding began to privatize and the industry began to market and distribute hybrid seeds.<sup>26</sup> During this era, the seed industry began to lobby Congress and was dealt a considerable victory by the passage of the Plant Patent Act of 1930, which will be discussed in greater detail below.<sup>27</sup> This era lasted roughly through 1945.

The fourth era is characterized by a decrease in publicly funded seed development programs and a relative increase in the private sector seed development programs.<sup>28</sup> Another notable characteristic of this era that should not be overlooked is the concentration of the seed industry through mergers and acquisitions.<sup>29</sup> It was during this era that the titans of the industry today were formed. The seed industry continues to grow in power and its influence is still felt on Congress.

One obstacle that prevented the seed industry from growing bigger even faster was the legal landscape of property law, which did not allow for seed “ownership” *per se*. While seeds

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<sup>22</sup> *Id.*

<sup>23</sup> *Id.*

<sup>24</sup> *Id.*

<sup>25</sup> *Id.*

<sup>26</sup> *Id.* at 266.

<sup>27</sup> *Id.*

<sup>28</sup> *Id.* (explaining that the government became a “source” of raw materials, information and germplasm for the private sector to utilize for commercial gain. Also, it should be noted that by the 1980s the government abandoned its varietal seed release programs and focused instead on research and development.)

<sup>29</sup> *Id.* at 285 (listing Ciba-Geigy, ARCO, Pfizer, Shell, W.R. Grace, and Monsanto as some of the major players in the seed industry at that time.)

are clearly commodities, PGRs are not; prior to the 1980s there simply was no mechanism that could secure PGRs within the proverbial bundle of property rights.<sup>30</sup> However, with the benefit of hindsight one observation cannot be overlooked: the increase of technology led to the growth of the seed industry and with that increase in size came influence with Congress. The correlation can be followed through reviewing legislative history and major court cases.

The Townsend-Purnell Plant Patent Act (“PPA”), 33 U.S.C. §161 (1930), was passed into law in May of 1930 and with its passage an idea of first impression was contemplated, codified and impressed upon the world.<sup>31</sup> Plant breeders pressured Congress to provide protection for new varieties of asexually producing plants; in this act, that goal was finally realized, notwithstanding the technical shortcomings that had heretofore kept PGRs from attaining utility patent protection, discussed in detail below.<sup>32</sup> However, Congress reasoned that plant breeders were aiding nature and should therefore be given some form of protection.<sup>33</sup> The protection came in the form of a patent-like grant, but it only applied to asexually reproducing plants. “Asexual” was defined through a series of cases to mean “[reproduced by] grafting, budding, cutting, layering, division, and the like.”<sup>34</sup> Noteworthy among cases interpreting the PPA was *Application of Le Grice*, 301 F. 2d 929 (1962).

In *Le Grice*, a rose breeder attempted to patent a variety of roses that he bred by cross-pollination, as opposed to the litany of asexual methods allowed for in the PPA. The court held that:

The production of seeds by cross-pollination does not assure the plant breeder that he has produced a true new plant variety having the characteristics desired. At this

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<sup>31</sup> Ann K. Wooseter, J.D, *Construction and Application of Plant Patent Act (35 U.S.C.A. §§161 et seq.)*,135 A.L.R. Fed. 272, §5 (1996); *see also*, Aoki, *supra* note 2 at 96.

<sup>32</sup> Aoki, *supra*, note 2 at 96-97.

<sup>33</sup> Wooseter, *supra* note 31 at §2.

<sup>34</sup> *Id.* at §5.

step, the principles of heredity and plant genetics introduce such variables that no two seeds from the parent cross can be expected to produce identical plants.<sup>35</sup>

The court went on to say that inheritable properties from parent plants that are transferred to offspring come from the fusing of nuclei of two or more different parent plants together, thereby creating a unique seed, which would fall outside of the purview of the PPA.<sup>36</sup> The dominant paradigm in 1962 was that germplasm was above individual ownership.<sup>37</sup>

Perhaps this paradigm is best illustrated by the court's opinion when it referred a very somber *Le Grice* to a poem by Alfred Tennyson, titled "Flower in the Crannied Wall,"

Flower in the crannied wall,  
I pluck you out of the crannies,  
I hold you here, root and all, in my hand,  
Little flower- but if I could understand  
What you are, root and all, and all in all,  
I should know what God and [Humankind] is.<sup>38</sup>

Soon after the *Le Grice* decision Congress passed another act expanding the plant breeder's rights of ownership to new unprecedented heights.

The Plant Variety Protection Act ("PVPA") was passed in 1970 with the hopes of further encouraging research and marketing of new varieties of plants with the intent of benefiting the general public.<sup>39</sup> Congress gave way to both domestic and foreign pressures in passing the PVPA.<sup>40</sup> Domestically, the plant breeding industry was growing in size and influence.<sup>41</sup> In the foreign affairs arena, Western European nations expanded the right to own PGRs in a 1960s convention establishing the International Union for the Protection of New Varieties of Plants

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<sup>35</sup> *Application of Le Grice*, 301 F. 2d 929, 938 (1962)(citing *Genetics and Eugenics*- W. E. Castle, Harvard University Press, 1932 (4th Edition)).

<sup>36</sup> *Id.*

<sup>37</sup> *Id.* (quoting, "[w]hile man can and does assist nature by the cross-pollination of selected parent plants, the actual creation of the new plant, because of the almost infinite number of possible combinations between the genes and chromosomes, is not presently subject to a controlled reproduction by act of man.")

<sup>38</sup> *Id.*

<sup>39</sup> Plant Variety Protection Act, 7 U.S.C. § 2581 (1970).

<sup>40</sup> Aoki, *supra* note 20 at 282.

<sup>41</sup> Aoki, *supra* note 2 at 128.

(“UPOV”).<sup>42</sup> The UPOV Convention was adopted in 1961 and ratified by the United Kingdom, the Netherlands, and Germany in 1968; subsequently other European countries signed on as well.<sup>43</sup> The UPOV provided for the protection of sexually reproduced plant varieties.<sup>44</sup> In order to have equally competitive markets, the United States passed the PVPA.

Under the authority of the PVPA, seed breeders in the United States could obtain a Plant Variety Protection Certificate for sexually reproducing varieties of plants and be secured by patent-like protection for virtually all novel, distinct, uniform, and stable varieties of plants.<sup>45</sup> The ability to attain patent-like protection for a seed variety may not sound like sweeping reform by today’s standards, but in 1970, the PVPA unveiled a whole new idea of ownership and opened a whole new corner of the market.

Although the PVPA increased individual rights to ownership over PGRs, it was not absolute. Primarily, the PVPA gave plant breeders and the seed industry the power to protect their immediate commitments, while still imposing certain limitations on ownership. For example, the PVPA had a grandfather exemption for plants that already existed in the public domain and three other important exceptions, discussed in greater detail below.<sup>46</sup>

The first of these exceptions allowed for farmers to save their seeds.<sup>47</sup> Farmers have been saving seeds since before the birth of modern agriculture. The “right to save seed” exception,

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<sup>42</sup> *Id.*

<sup>43</sup> International Union for the Protection of New Varieties of Plants, [www.upov.int/en/about/upov\\_convention.htm](http://www.upov.int/en/about/upov_convention.htm) (last visited, 03/22/2010).

<sup>44</sup> International Convention for the Protection of New Varieties of Plants of December 2, 1961, Art. 2 §2; Art. 4 §1, <http://www.upov.int/en/publications/conventions/1978/act1978.htm>, (last visited, 3-22-2010).

<sup>45</sup> 7 U.S.C. § 2402 (a)(1-4).

<sup>46</sup> 7 U.S.C. § 254 (stating that, “Nothing in this chapter shall abridge the right of any person, or the successor in interest of the person, to reproduce or sell a variety developed and produced by such person more than one year prior to the effective filing date of an adverse application for a certificate of plant variety protection.”)

<sup>47</sup> 7 U.S.C. § 2543 (quoting, “it shall not infringe any right hereunder for a person to save seed produced by the person from seed obtained, or descended from seed obtained, by authority of the owner of the variety for seeding purposes and use such saved seed in the production of a crop for use on the farm of the person, or for sale as provided in this section”).

also referred to as the “brown bag” exception, allowed farmers to save, replant and resell PVPA-protected seed to neighboring farmers.<sup>48</sup>

Additionally, the PVPA had a research exemption; thus, “the use and reproduction of a protected variety for plant breeding or other bona fide research shall not constitute an infringement of the protection provided under [the PVPA].”<sup>49</sup> This exception kept the industry from seizing a seed and having absolute control over that variety by ensuring the public and independent researchers were able to use the seed for further development.

Lastly, in the interest of generating a robust market, Congress enacted an intermediary exception, which allowed for the liberal distribution and advertisement of PVPA-protected seeds by limiting the amount of control that a PVPA-certificate holder had over post-sale activities.<sup>50</sup>

These exceptions symbolized Congress’s general attitude that private seed producers should be limited in the amount of power that could be wielded over the general public with respect to PGRs. However, not long after the passage of the PVPA Congress amended these exceptions, continuing the progressive trend towards privatization of PGRs.<sup>51</sup>

In 1994, the “right to save seed” crop exception was substantially narrowed.<sup>52</sup> As of April 4, 1994, any farmer who wished to sell PVPA-protected seeds to neighbors would be in violation of the PVPA.<sup>53</sup> However, the amendment did not prevent the farmer from saving seeds for personal use.<sup>54</sup>

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<sup>48</sup> Aoki, *supra* note 20 at 285.

<sup>49</sup> 7 U.S.C. § 2544.

<sup>50</sup> 7 U.S.C. § 2545 (quoting, “Transportation or delivery by a carrier in the ordinary course of its business as a carrier, or advertising by a person in the advertising business in the ordinary course of that business, shall not constitute an infringement of the protection provided under this chapter.”)

<sup>51</sup> Crocker, *supra* note 51 at 261.

<sup>52</sup> *Id.*

<sup>53</sup> *Id.*

<sup>54</sup> *Id.*

Although the combination of the PPA and PVPA, as amended in 1994, gave the seed industry substantial post-sale control over its products, there were legal alternatives that would grant even more protection, which meant more post-sale control and more potential profits.<sup>55</sup> The path to more profit was through the use of utility patents, which allow for maximum post-sale control over all seeds properly patented.

In order to qualify for a utility patent under The Patent Act, 35 U.S.C. §101 (2000) (“§101”), the invention had to be new, novel, and non-obvious, and there needed to be

a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.<sup>56</sup>

Furthermore, the subject matter had to be patentable, meaning that patent rights could only be extended to a person who invents “any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof.”<sup>57</sup> Thus, at the outset, plant breeders and the seed industry had to overcome two substantial legal hurdles. First, the written description requirement, which would eventually be overcome due to technological and scientific advancements that could satisfy the description requirement.<sup>58</sup> Second, at this time, the U.S. law did not recognize PRGs, or any other living organism, as patentable subject matter.<sup>59</sup> The first

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<sup>55</sup> Anne E. Crocker, *Will Plants Finally Grow into Full Patent Protection on an International Level? A Look at the History of U.S. and International Patent Law Regarding Patent Protection For Plants and the Likely Changes After the U.S. Supreme Court’s Decision in J.E.M. AG Supply v. Pioneer Hi-Bred*, 8 Drake J. Agric. L. 251, 262, (2003) (explaining that under the PPA and PVPA an inventor-breeder could only claim one plant as a whole, while with the protection offered under a utility patent all of the individual components of the variety could be claimed, including the DNA sequence, gene, tissue culture, seed, or specific plant parts. Furthermore, with the utility patent the methods used to make certain varieties could be patented. Lastly, the benefits to achieving protection under utility patent status are the strict enforcement provisions.)

<sup>56</sup> The Patent Act, 35 U.S.C. §§ 101 -112 (2000).

<sup>57</sup> Aoki, *supra* note 20 at 287 (citing 35 U.S.C. §101).

<sup>58</sup> Crocker, *supra* note 55 at 262.

<sup>59</sup> Aoki, *supra* note 20 at 287 (citing 35 U.S.C. §101).

hurdle was overcome by technological and scientific advancement; however, the Supreme Court played a pivotal role in helping the seed industry clear the second hurdle.

In *Diamond v. Chakrabarty*, 1447 U.S. 303 (1980), the Supreme Court granted *certiorari* to determine whether a live, human-made microorganism is patentable subject matter under §101.<sup>60</sup> In dispute in *Chakrabarty* was the invention of a human-made bacterium that could break down components of crude oil.<sup>61</sup> Chakrabarty, the inventor, created the bacterium and a delivery device that would disperse the bacterium into areas devastated by oil spills.<sup>62</sup> The bacterium worked to break down the crude oil into its component substances, which are less harmful to the marine environment. He sought three separate patents claims: the first was for the method of producing the bacteria; the second was for the floatation delivery device that would carry and disperse the bacterium at oil spill sites; and the third was for the bacteria itself.<sup>63</sup>

The first two patent applications were accepted by the Patent Officer, but the third application for the bacteria itself was rejected on two grounds: (1) that microorganisms are “products of nature,” and (2) that as living things they are not patentable subject matter under §101.<sup>64</sup> The Court dismissed these contentions and disregarded the Patent Office’s two primary supporting arguments for rejecting the application. The first argument that was rejected was that Congress never intended for living things, like microorganisms, to be patentable subject matter, pointing to the existence of the PPV and PVPA. The second argument was that Congress, and not the Court, had the power to expand or restrict patentability.

Once these arguments were dispensed with the Court was free to engage in statutory interpretation. It needed to decide whether the microorganism constituted a “manufacture” or

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<sup>60</sup> *Diamond v. Chakrabarty*, 1447 U.S. 303, 305 (1980).

<sup>61</sup> *Id.*

<sup>62</sup> *Id.* at 306.

<sup>63</sup> *Id.* at 306.

<sup>64</sup> *Id.* at 311-312.

“composition of matter” within the meaning of §101.<sup>65</sup> The Court believed that Congress intended patent laws to be given a “wide scope” and so it broadly interpreted the terms to include the living organisms in question, thus sanctioning the patentability of life.<sup>66</sup>

*Chakrabarty* was a remarkable step forward for the seed industry; however, it did not explicitly stand for the proposition that plants could receive utility patent protection. There were a series of cases riding down the slippery slope left in the wake of *Chakrabarty*, and eventually the Court reached the issue of whether plants and PGRs could receive utility patent protection.

*Ex Parte Hibbard*, 227 U.S.P.Q. 443 (1985), was the first case after *Chakrabarty* that helped to place PGRs into the palms of private industry. The issue in *Ex Parte Hibbard* was whether a sexually reproduced plant that has been genetically altered could *potentially* receive a utility patent under the 35 U.S.C §101.<sup>67</sup> While *Hibbard* was decided by the United States Patent and Trademark Office (“USPTO”) Board of Appeals, and not the Supreme Court of the United States, it was still a very important decision for the seed industry.

The USPTO Board of Appeals rejected the patent examiner’s initial assertion that Congress intended plants to be protected according to the PPA and the PVPA and not under the Patent Act.<sup>68</sup> Instead, the Board of Appeals invoked the reasoning of the *Chakrabarty* majority, declaring that Congress intended §101 to be interpreted broadly to include “everything under the sun that is made by man.”<sup>69</sup>

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<sup>65</sup> *Id.* at 307.

<sup>66</sup> *Id.* at 310.

<sup>67</sup> *Ex Parte Hibbard*, 227 U.S.P.Q. 443 (1985) (stating, “the subject matter on appeal relates to maize plant technologies, including seeds..., plants... and tissue cultures... which have increased free tryptophan levels, or which are capable of producing plants or seeds having increased free tryptophan levels, or which are capable of producing plants or seeds having increased tryptophan content.)

<sup>68</sup> *Id.* at 444 (quoting, “We disagree... that the scope of patentable subject matter under Section 101 has been narrowed or restricted by the passage of the PPA and the PVPA and that these plant-specific Acts represent the exclusive forms of protection for plant life covered by those acts.”)

<sup>69</sup> *Id.* at 444 (declaring, “Preliminarily, we note that the Supreme Court has interpreted the scope of 35 U.S.C. §101 in the recent case of *Diamond v. Chakrabarty*, 447 U.S. 303 (1980).” From the very beginning of the decision the

*Ex Parte Hibbard* was a threshold decision, declaring only that plants are not proscribed from patent protection under §101; consequently, no patent was granted to any particular plant from this decision.<sup>70</sup> Notwithstanding the holding in *Ex Parte Hibbard*, the seed industry did not necessarily rush to the USPTO to apply for utility patents. The industry had time, energy and product invested in, and protected under, the PVPA and PPA.<sup>71</sup> *Asgrow Seed Co. v. Winterboer*, 513 U.S. 179 (1995), reflects the industry's desire to make use of the current framework provided by the PVPA.

*Asgrow Seed Co. v. Winterboer* was an attack on the “right to save seed” crop exception codified in the PVPA. *Asgrow Seed Co.* sued the Winterboers, an Iowa-based farming couple who used *Asgrow Seed Co.* soybean seeds, for violating its PVPA-protected seed varieties. In 1990, the Winterboers planted *Asgrow Seed Co.* soybean seeds on 265 acres of their 800-acre farm.<sup>72</sup> The Winterboers raised and sold the soybeans to other farmers in a typical practice known as “brown bagging.”<sup>73</sup>

At issue in *Asgrow Seed Co.* was whether the interpretation of the “right to save seed” crop exception in the PVPA would allow farmers to continue making brown bag sales between farmers. The Court summarized its interpretation of the exception as follows:

[The “right to save seed” crop exception] allows seed that has been preserved for reproductive purposes (“saved seed”) to be sold for such purposes. The structure of the sentence is such, however, that this authorization does not extend to saved seed that was grown for the very purpose of sale (“marketing”) for replanting... [T]his means that the only seed that can be sold under [the “right to save seed” exemption] is seed that has been saved by the farmer to replant his own acreage.<sup>74</sup>

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Board of Appeals intended to follow the expansive view of the *Chakrabarty* majority. The idea that “everything under the sun made by man” intuitively excludes plants was not grappled with.)

<sup>70</sup> Crocker, *supra* note 55 at 267.

<sup>71</sup> *Id.*

<sup>72</sup> *Asgrow Seed Co. v. Winterboer*, 513 U.S. 179, 182 (1995).

<sup>73</sup> *Id.* (explaining that a “brown bag” sale occurs when a farmer purchases seeds from a seed company, plants the seeds in the farmer’s own field, harvests the crop, cleans the crop, and then sells the reproduced seeds to other farmers.)

<sup>74</sup> *Id.* at 190-191.

Under the Court’s interpretation, farmers could no longer save more seed than could be grown and could no longer legally grow crops for the purpose of making brown bag sales to neighbors unless that farmer absorbed the loss.<sup>75</sup>

On this point Justice Stevens dissented from the majority, stating that “The seed at issue is part of a crop planted and harvested by a farmer on his own property. Generally the owner of personal property—even a patented or copyrighted article—is free to dispose of that property as he sees fit.”<sup>76</sup> However, the majority rejected this view, instead opting to give the industry more post-sale control over descendant seeds that farmers grow.<sup>77</sup> The seed industry won a significant victory in *Asgrow Seed Co.*, but fell short of the potential post-sale control that could be attained by the comprehensive protection provided by the utility patent. However, whether a plant could technically qualify for protection under the Patent Act had yet to be legislatively or judicially determined.

Finally, in *J.E.M. Ag Supply v. Pioneer Hi-Bred International, Inc.*, 534 U.S. 124 (2001), the Supreme Court had an opportunity to resolve the issue in a direct challenge to the validity of a utility patent for plants. Justice Clarence Thomas, writing for the majority, was presented with the issue “whether utility patents may be issued for plants under 35 U.S.C §101, or whether the [PVPA] and the [PPA] are the exclusive means of obtaining a federal statutory right to exclude others from reproducing, selling, or using plants or plant varieties.”<sup>78</sup>

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<sup>75</sup> *Id.* at 191.

<sup>76</sup> *Id.* at 195 (Stevens, dissenting)(stating, his interpretation of the statute is more “consistent with [the Court’s] time-honored practice of viewing restraints on the alienation of property with disfavor.”)

<sup>77</sup> *Id.* at 188 fn 3 (quoting, “The whole purpose of the statute is to create a valuable property in the product of botanical research by giving the developer the right to ‘exclude others from selling the variety, or offering it for sale, or reproducing it, or importing it, or exporting it,’ etc.”)

<sup>78</sup> *J.E.M. Ag. Supply v. Pioneer Hi-Bred International Inc.*, 534 US 124, 127 (2001).

At this time, patents were being granted to plants unchallenged, despite no official declaration that the patents were valid.<sup>79</sup> Pioneer Hi-Bred International Inc. (“Pioneer”) held seventeen patents on various plants.<sup>80</sup> J.E.M. Ag Supply, Inc. (“J.E.M.”), its distributors and customers were all purchasing Pioneer’s hybrid corn products and reselling Pioneer products. Pioneer brought suit claiming that the use of its hybrid seed was a patent infringement. If the Court determined that the Pioneer utility patents were valid, J.E.M. would certainly have infringed on those patent rights. Conversely, if the Court decided that the Pioneer utility patents were not valid, and that the PVPA was the proper statute to provide protection for Pioneer seed products, then there would have been no violation under the PVPA due to the exceptions.<sup>81</sup>

J.E.M. brought three arguments against the assertion that plants were the proper subject matter for utility patent protection using the PPA and two corollary arguments using the PVPA.

J.E.M. first argued that plants could not be granted utility patents prior to 1930, which is why Congress enacted the PPA. J.E.M. contended that historically, plants were precluded from attaining utility patent protection for two reasons: (1) inappropriate subject matter, i.e., plant matter is a product of nature, and (2) the “written description” requirement of §101 could not be satisfied.

The majority disregarded J.E.M.’s positions, not as invalid but as irrelevant. Justice Thomas asserted that the aforementioned reasons may have been the exact reasons why plants were not patented in 1930, however, those reasons do not mean that plants were lacking the *potential* to fall within the subject matter of §101. Justice Thomas stated that Congress only *believed* that plants were not patentable under §101 and Congress was simply incorrect in its

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<sup>79</sup> *Id.* at 127 (explaining that there were, at the time the case was decided, 1,800 patents issued for various plants under 35 U.S.C. § 101.)

<sup>80</sup> *Id.*

<sup>81</sup> *Id.* at 140.

belief.<sup>82</sup> *Chakrabarty*, according to the majority, stood for the proposition that living organisms were patentable subject matter under the Patent Act. It also recognized that advances in biotechnology have cured the inability of plant breeders to satisfy the “written description” requirement of §101. Thus, the potential to patent plant life always existed and is only now capable of being realized.<sup>83</sup>

The second position that J.E.M. argued was that the PPA limitations to asexually reproduced plants would make no sense if Congress intended the Patent Act to include plant matter. However, the Court disregarded this argument as “reflect[ing] the reality of plant breeding in 1930,” referring to scientific limitations on creating stable sexually reproduced plant breeds.<sup>84</sup>

The third argument was that Congress would not have moved the PPA from 35 U.S.C. §101 to 35 U.S.C. §161 in 1952 if Congress intended for plant matter to be included in the general subject matter of the Patent Act.<sup>85</sup> Once again, the Court dismissed J.E.M.’s contention as a negative inference of congressional intent and the Court was comfortable categorizing the shifting placement of the statute as a congressional housekeeping measure.<sup>86</sup>

J.E.M. made corollary arguments, similar to its arguments regarding PPA, that by passing the PVPA into law, Congress clearly intended to provide the exclusive means of protection for sexually reproduced plants, and by inference, had no intent to expand the subject matter covered by the general utility patent.<sup>87</sup>

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<sup>82</sup> *Id.* at 134.

<sup>83</sup> *Id.* at 135.

<sup>84</sup> *Id.*

<sup>85</sup> *Id.* at 137-138.

<sup>86</sup> *Id.* at 138.

<sup>87</sup> *Id.*

The Court responded to this argument by pointing out that the PVPA lacked any explicit provision designating it the exclusive means by which sexually reproduced plants could be legally protected. Thus, the Court rejected the negative inference that by passing the PVPA Congress intended the PVPA to be the exclusive means by which sexually reproducing plants receive protection. At the same time, however, the Court was willing to accept the inverse negative inference, namely, that Congress *must not* have intended the PVPA to be the exclusive means by which plants receive protection as indicated by its explicit omission of a provision identifying the PVPA as the exclusive means for plant protection.<sup>88</sup>

The Court further stated that PVPA and the Patent Act serve two similar, but distinct, functions.<sup>89</sup> The distinction is that, under the PVPA, a PVP certificate holder receives relatively mediocre protection. The utility patent holder, on the other hand, receives comprehensive protection.

Notwithstanding passage of the PPA and the PVPA, the Court concluded that all plants are patentable subject matter and held that plants have always been capable of attaining patent protection but only recently had technology become advanced enough to meet the requirements.<sup>90</sup> It follows then, that Congress only enacted the PPA and the PVPA to provide temporary, mediocre protection until such time as technology could adequately describe new plant varieties under the Patent Act. Congress must have also had the foresight to anticipate the *Chakrabarty* decision, which held that living organisms were, in fact, patentable subject matter. The majority's reasoning is both mystifying and conclusory.

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<sup>88</sup> *Id.*

<sup>89</sup> *Id.* (quoting “[b]ecause it is harder to qualify for a utility patent than for a Plant Variety Protection (“PVP”) certificate, it only makes sense that the utility patent would confer a greater scope of protection.”)

<sup>90</sup> *Id.* at 134.

According to Justice Breyer’s dissent, the arguments that J.E.M. used to support its position were complicated and off point.<sup>91</sup> J.E.M.’s general position was flawed because it accepted the proposition that *Chakrabarty* applies to all living organisms. Justice Breyer would have distinguished *Chakrabarty* from the facts in *J.E.M. Ag Supply* by proposing that *Chakrabarty* applied only to nonplant life forms, such as bacteria, and not to plant life forms that were at issue in *J.E.M. Ag Supply*. He states, “[t]he question is *not* about general coverage for matters that the special statutes [referring to the PPA and the PVPA] *do not* mention (namely, nonplant life forms such as bacteria). It *is* about general coverage for matters to which the special plant statutes do refer (namely, plants). *Chakrabarty* neither asked, nor answered, this latter question...” which, according to Justice Breyer, was the real question before the Court.<sup>92</sup>

In the wake of legislative and judicial treatment of plant matter and PGRs, the private industry gained a substantial amount of control over these resources. By passing the PPA, PVPA, and by not altering the Supreme Court’s interpretation of the Patent Act, the purported purposes of the statutes were being undermined. Congress intended to bolster the agricultural industry by providing the mechanisms through which plant breeders could protect their efforts, fuel competition and creativity, and maintain a robust marketplace. However, the practical impact on the seed industry has been just the opposite.

Studies have shown that patent protection is used to block other entities from entering into the market.<sup>93</sup> It has been reported that since the *Chakrabarty* decision and its progeny, the number of independent seed companies worldwide has declined substantially.<sup>94</sup> As a result, companies have consolidated, buying out all independent competition and using patent

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<sup>91</sup> *Id.* at 149.

<sup>92</sup> *Id.*

<sup>93</sup> Vandana Shiva, *Biopiracy: The Plunder of Nature and Knowledge*, 13 (South End Press 1997).

<sup>94</sup> *Id.*

protections to control post-sale activity of purchasers and ultimately the way food is produced.<sup>95</sup> Companies like Monsanto serve as an example of the empires the seed industry has been able to build by capitalizing on the husbandry of a collective human effort existing since before the beginning of agricultural societies.

Monsanto was founded in 1901 as a chemical manufacturer among many other chemical manufacturers. Today it is one of the world's largest agricultural companies.<sup>96</sup> In the 1970s Monsanto developed glyphosate, a post-emergent, non-selective herbicide, known today as Roundup. Shortly after patenting Roundup, Monsanto began experimenting in biotechnology and seed development which eventually led to a change from chemicals to agriculture.<sup>97</sup>

Monsanto produces several seed brands of large-acre crops like corn, cotton, soybeans and canola, as well as the leading "in-the-seed" trait technologies, which are allegedly for the benefit of farmers. Essentially, Monsanto took the practices that humans have been doing since agriculture came about, maximizing the potential of a seed, patented it, and sold it to farmers so they could get more out of each seed.<sup>98</sup> It is a company that prides itself on the use of modern biology to help farmers get larger yields. "After all," Monsanto concedes, "it is the world's farmers that truly feed, clothe and fuel our growing world."<sup>99</sup> Monsanto sees itself as a facilitator of human necessities and "[a]s a company, [they] remain committed to broadly *licensing* [their] seed and trait technologies to other companies throughout the world."<sup>100</sup> One of the ways

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<sup>95</sup> *Id.* at 37.

<sup>96</sup> Monsanto, [www.monsanto.com/who\\_we\\_are/default.asp](http://www.monsanto.com/who_we_are/default.asp) (last visited 03/05/2010); Nicole C. Nachtigal, *A Modern David and Goliath Farmer v. Monsanto: Advising a Grower on the Monsanto Technology Agreement*, 6 Great Plains Nat. Resources J. 50, 57 (Fall, 2001).

<sup>97</sup> Nicole C. Nachtigal, *A Modern David and Goliath Farmer v. Monsanto: Advising a Grower on the Monsanto Technology Agreement*, 6 Great Plains Nat. Resources J. 50, 57 (Fall, 2001).

<sup>98</sup> Monsanto, [www.monsanto.com/who\\_we\\_are/default.asp](http://www.monsanto.com/who_we_are/default.asp) (last visited 03/05/2010).

<sup>99</sup> *Id.*

<sup>100</sup> *Id.* (emphasis added).

Monsanto got to the top was by developing a Roundup-resistant protein that could be inserted into a seed, passing on that resistant trait to the seed.

When Monsanto began to dabble in biotechnology in the 1980s its goal was to create a gene resistant to its already popular Roundup herbicide.<sup>101</sup> Eventually, Monsanto achieved its goal and began inserting the Roundup-resistant gene into various seeds, dubbed Roundup Ready seeds.<sup>102</sup> Farmers benefit from the use of Roundup Ready seeds because Roundup is a non-selective herbicide that kills almost every plant it comes into contact with, except, of course, the plants that have the Roundup resistant gene. Farmers who use Roundup are capable of harvesting virtually weed-free fields with the benefit of only having to apply one herbicide.<sup>103</sup> Once Monsanto was able to patent the PGRs of those seeds, it could protect its investment and its profits through patent laws, discussed above.

Thus, the pros of choosing Monsanto Roundup Ready seeds are summed up: farmers are able to achieve a greater yield while only having to use one herbicide. By using all Monsanto products, farmer's lives are improved due to increased production in less time with fewer inputs.<sup>104</sup> From a business standpoint the process seems fair. Monsanto makes a product and consumers buy into the product because it is superior to alternative products. However, Monsanto does not just sell a product; it sells a product with strings.

Patent law protects Monsanto seeds and chemicals. In addition to the patent protection, Monsanto conditionally licenses its seeds to buyers by requiring its buyers to comply with the Monsanto Technology Agreement (“MTA”).<sup>105</sup> The MTA is a contract between a grower and

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<sup>101</sup> Nachtigal, *supra* note 96 at 57.

<sup>102</sup> *Id.* at 58.

<sup>103</sup> *Id.*

<sup>104</sup> Monsanto, [www.monsanto.com/products/benefits.asp](http://www.monsanto.com/products/benefits.asp) (last visited on 3/03/2010).

<sup>105</sup> Monsanto, [www.monsanto.com/monsanto/ag\\_products/pdf/stewardship/technology\\_use\\_guide.pdf](http://www.monsanto.com/monsanto/ag_products/pdf/stewardship/technology_use_guide.pdf) (explaining, “If Monsanto reasonably believes that a farmer has planted saved seeds containing a Monsanto biotech trait...”

Monsanto intended to ensure a “level playing field for the vast majority of honest farmers who abide by [the] agreements, and to discourage using technology illegally to gain an unfair advantage.”<sup>106</sup> The MTA does not allow any seed saving, ensures licensees use all Monsanto products on all Monsanto crops, gives Monsanto the authority to inspect grower’s fields at any time, and grants Monsanto access to all records and documents relating to business, just to name a few of the restrictions.<sup>107</sup>

The MTA is controversial. Competitors like DuPont, small farmer groups and even the Department of Justice have sued, or made inquiries into, possible antitrust violations regarding Monsanto's MTAs. The primary objection is that with the patents and the MTA, Monsanto has extraordinary post-sale control over its products. William Wenzel, a member of the nonprofit Farmer to Farmer Campaign on Genetic Engineering, was quoted in *Forbes* magazine as saying that “[c]oncentration in the seed industry has resulted in higher prices and less choice’ for farmers.”<sup>108</sup> Other small farmers make the claim that Monsanto is trying to eliminate all conventional seeds.<sup>109</sup> This proposition may present a real threat to farmers and the general public because Monsanto is a business with its interest fixed on profits and consumer dependency, not the general welfare.

Hugh Grant is the Chairman, President and Chief Executive Officer of Monsanto. In an interview with *Forbes* magazine, he recognized the role that traditional plant breeding plays in keeping his business model successful: “[i]f you have incredibly brilliant biotech and

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Monsanto will demand bank records and invoices and if these are not provided, Monsanto will come to that farmer’s land, collect seeds, and test those seeds for patent infringement.) (last visited, 03/14/2010).

<sup>106</sup> <http://www.monsanto.com/seedpatentprotection>, accessed on 04/15/2010.

<sup>107</sup> 2010 Monsanto Technology and Stewardship Agreement Form, *accessed* at [www.monsanto.com/monsanto/.../stewardship/technology\\_use\\_guide.pdf](http://www.monsanto.com/monsanto/.../stewardship/technology_use_guide.pdf) (last visited 04/15/2010).

<sup>108</sup> Robert Langreth and Matthew Herper, *The Planet Versus Monsanto*, *Forbes Magazine*, January 18, 2010, accessed at [www.forbes.com/forbes/2010/0118/americas-best-company](http://www.forbes.com/forbes/2010/0118/americas-best-company) (last visited 04/15/2010).

<sup>109</sup> *Id.*

extraordinarily average seed you will end up with average crop yields.”<sup>110</sup> He goes on to admit, that what makes his product successful is the preprogrammed yield of traditional seed breeding, coupled with the protection that genetic engineering provides.<sup>111</sup>

According to *Forbes* magazine, 90% of the U.S. soybean crop and 80% of the corn crop and cotton crop are grown with Monsanto seed.<sup>112</sup> “Although farmers complain about Monsanto's prices... they still buy the seeds.”<sup>113</sup> Grant justifies the means by the ends and argues that the marketplace is a democratic forum; after all, “farmers vote one spring at a time.”<sup>114</sup> However, Monsanto’s business practices are far from democratic. A citizen is free to abstain from exercising her right to vote, thereby surrendering her license to complain about the political establishment. However, a farmer must plant or cease to farm. Furthermore, a farmer’s product choice is necessarily constrained by the competitive nature of the market.

The real life implications of Monsanto’s business practices and the framework of patent law left in the wake of *J.E.M. Ag. Supply v. Pioneer Hi-Bred International* are alarming. The more saturated the market becomes with Monsanto products, the more control Monsanto is able to exert over food production. The impact on individual farmers can be illustrated by the following two cases: *Monsanto Co. v. McFarling*, 488 F. 3d 973 (2007), an example of a standard violation of Monsanto patents and the MTA, and *Monsanto Canada, Inc. v. Schmeiser*, 2002 F.C. 309, an example of a farmer who did not choose to plant Monsanto crops at all, but was penalized as a matter of happenstance.

In *Monsanto Co. v. McFarling*, McFarling purchased Monsanto’s Roundup Ready soybeans through a seed distributor. In 1998, McFarling planted the seeds and harvested the

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<sup>110</sup> *Id.*

<sup>111</sup> *Id.*

<sup>112</sup> *Id.*

<sup>113</sup> *Id.*

<sup>114</sup> *Id.*

soybeans. Notwithstanding the MTA that McFarling signed, he cleaned and saved the seeds. In 1999, McFarling planted the saved seeds without first relicensing them with Monsanto. Monsanto, having learned about the infringement through its team of investigators, sued McFarling for a violation of the MTA and patent infringement.<sup>115</sup> The court sided with Monsanto and awarded damages and an injunction preventing McFarling from planting any of the saved seeds in the future.<sup>116</sup>

In *Monsanto Canada, Inc. v. Schmeiser*, Percy Schmeiser was found guilty of infringing on Monsanto's canola seed patent despite never having purchased or intentionally planted Monsanto's patented canola seed.<sup>117</sup> The court never definitively answered the question whether a person could unknowingly and innocently infringe on a patent because it held that Schmeiser knew or should have known that the seeds he saved, and subsequently planted, were Roundup-resistant.<sup>118</sup> It is quite possible that the patented gene was transferred to Schmeiser's canola plants via natural cross-pollination.<sup>119</sup> However, the *Schmeiser* court never definitively determined the origin of how the patented gene came to enter Schmeiser's canola plants. Rather, the court skipped the issue and held that Schmeiser knew or should have known the seed he saved, and subsequently replanted, had Roundup-resistance, which was enough to find an infringement.<sup>120</sup>

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<sup>115</sup> Adam Liptak, *Saving Seeds Subjects Farmers to Suits Over Patent*, New York Times, Nov. 2, 2003, accessed at [www.nytimes.com](http://www.nytimes.com) on 04/15/2010 (noting that Monsanto investigators have been intrusive, divisive, and heavy-handed with local farmers.); [www.monsanto.com/seedpatentprotection/monsantos\\_position.asp](http://www.monsanto.com/seedpatentprotection/monsantos_position.asp), accessed on 04/15/2010 (admitting to the use of an investigative unit as necessary to protect its proprietary interests.); *see also*, Langreth, *supra* note 107.

<sup>116</sup> *Id.* at 981.

<sup>117</sup> *Monsanto Canada, Inc. v. Schmeiser*, 2002 F.C. 309, at ¶18 (noting that, as a matter of fact, Mr. Schmeiser never purchased any of Monsanto's Roundup Ready canola.); *See also*, Carlos Scott Lopez, *Intellectual Property Reform for Genetically Modified Crops: A Legal Imperative*, 20 J. Contemp. Health L. & Pol'y 367, 408 (noting that although, *Schmeiser* is a Canadian case, intellectual property issues and precedents transcend international boards.)

<sup>118</sup> *Id.* at ¶57.

<sup>119</sup> *Id.* ¶49.

<sup>120</sup> *Id.*

It is troubling that a farmer may have a crop become infected with a patented gene trait, through no fault of his own and then be burdened with a legal duty to act. A farmer in Schmeiser's position must either plant seed and risk patent infringement, or purchase all new seed. Farmers must now take precaution when planting crops that are susceptible to cross pollination for fear of patent infringement. Farmers are also proscribed from not-for-profit seed swapping with neighbors, which was once a common practice among farmers. It is conceivable that in the foreseeable future, the only means to obtain seeds will be through large companies like Monsanto. This prospect raises the legitimate fear that the Monsanto business model will lead to monocultures around the world.

Historically, monocultures have been disastrous for isolated regions. A large company like Monsanto distributes its seeds all around the world. As the market for diverse, non-genetically modified seeds shrinks, genetic diversity shrinks as well.<sup>121</sup> Biodiversity is commonly referred to as an "insurance policy," and it follows that lack of biodiversity leaves the world vulnerable to pests, crop diseases, and blights.<sup>122</sup> History is replete with examples of the hazardous consequences that can result from monocultures, including the Irish potato famine, the Southern Corn Leaf Blight, and the Bollgard Cotton fiasco.

The Irish potato famine took place in the 1840s and was caused by a potato fungus. Virtually all of Ireland used a variety of potato from the Andes that was particularly susceptible to a particular fungus; the fungus devastated the potato yield and caused severe famine.<sup>123</sup> The Southern Corn Leaf Blight took place in the 1970s. A particular variety of corn plant was bred by humans in order to reduce the labor-intensive detasseling process and was widely distributed

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<sup>121</sup> Aoki, *supra* note 2, at 124; *see also*, Judith Koons, *Earth Jurisprudence: The Moral Value of Nature*, 25 *Pace Env'tl. L. Rev.* 263, 318 (2008).

<sup>122</sup> Aoki, *supra* note 2 at 135.

<sup>123</sup> *Id.* at 125.

throughout the southern United States. This particular breed of corn was also vulnerable to a type of fungus, which essentially ruined a reported one billion bushels of corn.<sup>124</sup> More recently, the Bollgard cotton fiasco of 1996 affected approximately two million acres of land.<sup>125</sup> A Monsanto-engineered, genetically altered Bollgard cotton plant caused this devastation.<sup>126</sup> The cotton was designed to resist the bollworm, a common cotton pest. However, the bollworm infestation of the Bollgard cotton was reported to be 20 to 50 times the level that would normally trigger a pesticide treatment.<sup>127</sup> These types of incidents demonstrate the troubling consequences that trickle down from developing monocultures. Furthermore, it should be noted that the costly lessons learned from these experiments are borne by private farmers, not large companies like Monsanto.<sup>128</sup>

Other derivative impacts of embracing monocultures include the increased use of pesticides,<sup>129</sup> the possibility of creating and proliferating “superweeds” from the widespread use of pesticide-resistant genes<sup>130</sup> and potentially breeding the ability to adapt out of the genetic structures of high-yielding species of plants.<sup>131</sup> The litany of potential effects from these genetic experiments being played out today is the subject of books and ongoing debates; this comment does not purport to be an exhaustive inventory. However, the physical and economic effects of monocultures, the commoditization of PGRs, and post-sale control of all seed and seed derivatives have other moral and ethical implications as well.

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<sup>124</sup> *Id.*

<sup>125</sup> Shiva, *supra* note 92 at 36.

<sup>126</sup> *Id.*

<sup>127</sup> *Id.*

<sup>128</sup> *Id.* at 37.

<sup>129</sup> The Organic Consumers Association, *Stop Monsanto's Genetically Modified Alfalfa!*, #209, 01/21/2010. <http://www.organicconsumers.org/bytes/ob209.htm> (last visited 04/15/2010).

<sup>130</sup> Shiva, *supra* note 92 at 36.

<sup>131</sup> Aoki, *supra* note 2 at 126.

Dr. Vandana Shiva, one of the most recognized figures against commoditization of PGRs, notes:

Patents on life and the rhetoric of the “ownership society” in which everything—water, biodiversity, cells, genes, animals, plants—is property express a worldview in which life forms have no intrinsic worth, no integrity, and no subjecthood. It is a worldview in which the rights of farmers to seed... can be freely violated. The rhetoric of the “ownership society” hides the anti-life philosophy of those who... seek to own, control, and monopolize all of the earth’s gifts and all of human creativity.<sup>132</sup>

Dr. Shiva is referring to the literal conquering of the agrarian culture by the industrial machine.

Wendell Berry defines the distinction between agrarian and industrial thusly, “whereas industrialism is a way of thought based on monetary capital and technology, agrarianism is a way of thought based on land.”<sup>133</sup> The agrarian culture binds the farmer to the land, leading farmers, and via demand, industrial suppliers, to make decisions based on what is best for the land.<sup>134</sup> The Monsanto model, representing industrial agriculture, alienates farmers from traditional agrarian practices, such as diversifying seeds with neighbors, and practically forces the hand of farmers to exercise farming practices that are out of step with their values.<sup>135</sup>

The law has developed against the individual farmer’s interest. Society must push back by adopting new principles of sustainability. Corrective legislation must be passed and notions of Earth jurisprudence must be incorporated into that legislation in order to establish an appropriate framework for the stewardship of PGRs and sustainable farming practices.

Earth jurisprudence is the idea that the Earth is a community of interrelated entities and the goal of Earth jurisprudence is to encourage and support the relationships between all

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<sup>132</sup> Vandana Shiva, *Principles of Earth Democracy* 3 (South End Press) (2005).

<sup>133</sup> Berry, *supra* note 1 at 42.

<sup>134</sup> *Id.* at 45.

<sup>135</sup> Ron Kroese, *Industrial Agriculture’s War Against Nature*, in *The Fatal Harvest Reader: The Tragedy of Industrial Agriculture* 102 (Andrew Kimbrell ed., Island Press) (2002).

members of that community.<sup>136</sup> Earth jurisprudence is drawn from a philosophy that has been expressed by many thinkers from Thomas Berry and Brian Swimme's *The Universe Story*,<sup>137</sup> to James Lovelock's Gaia theory and Aldo Leopold's Land Ethic theory.<sup>138</sup> The common theme running through these theories is that the Earth is an interconnected, self-regulating system that deserves to be worked with, not against.<sup>139</sup> The Earth, according to Gaia theory, will manage itself to make the conditions as favorable as possible for life.<sup>140</sup> According to the Land Ethic theory, which complements the Gaia theory, humans should only take actions that preserve the integrity, stability and beauty of the biotic community.<sup>141</sup> Together, these theories could work to shape a moral and ethical framework for approaching a new agricultural model with the Earth Community's best interest in mind.

The framework that exists today is substantially insufficient to promote the best interests of the Earth Community. Farmers around the world, who should be the biggest advocates for sustainability, are no longer capable of making decisions based on what is best for the land. Farmers are compelled to compete by raising the highest yielding crops per acre by the cheapest means available. Unfortunately, this means that the majority of farmers purchase patented seeds from companies like Monsanto and submit to corporate control.<sup>142</sup> Cormac Cullinan points out in *Wild Law* that this practice weakens human communities who are dependant on external inputs, while at the same time undermining the regenerative systems of agriculture and sustainable use

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<sup>136</sup> Cormac Cullinan, *Wild Law: A Manifesto for Earth Justice* 130 (Green Books 2003).

<sup>137</sup> See generally, Thomas Berry and Brian Swimme, *The Universe Story: From the Primordial Flaring forth to the Ecozoic Era*, Harper Collins, San Francisco 1992; Cullinan, *supra* note 127 at 131.

<sup>138</sup> Judith Koons, *Earth Jurisprudence: The Moral Value of Nature*, 25 Pace Env'tl. L. Rev. 263, 306 (2008).

<sup>139</sup> *Id.*

<sup>140</sup> *Id.*

<sup>141</sup> Cullinan, *supra* note 127 at 131.

<sup>142</sup> *Id.* at 177.

of biodiversity.<sup>143</sup> The blatant disregard for stability and integrity of the Earth Community is not confined to the borders of the United States; however, it does find its origins and authority there.

The legal regime that companies like Monsanto operate within has spread worldwide because the seed industry is global. Farmers across the world suffer from the same exploitation and coercion. In fact, the exploitation is even more poignant in developing countries of the Southern hemisphere because, ironically, Northern hemisphere biotech seed companies utilize PGRs from developing Southern hemisphere countries.<sup>144</sup> This unethical state of affairs has been characterized as the North-South Global Cultural Conflict.<sup>145</sup> It has been reported that of the twenty most utilized food crops harvested in the United States not a single one is native to the United States, most being extracted from the West Central Asiatic and Latin American regions.<sup>146</sup>

The U.S. legal regime has successfully proliferated through international treaties such as the Trade-Related Aspects of Intellectual Property Rights (“TRIPS”), which essentially adopted U.S. intellectual property rights and applied that structure to all signatory states.<sup>147</sup> The consequences for the developing world, which harbor so much of the valuable PGRs used by biotech seed companies today, leave those countries with virtually no benefit.<sup>148</sup> The inequity of the North-South Global Cultural Conflict is unconscionable and can only be corrected by making a conscious, concerted effort by the global community. Furthermore, the ownership regime embraced by the global community must also be corrected in order restore respect for natural processes, PGRs, and local farmers around the world.

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<sup>143</sup> *Id.*

<sup>144</sup> Koons, *supra* note 133 at 319.

<sup>145</sup> *Id.*

<sup>146</sup> *Id.* at 320.

<sup>147</sup> *Id.* at 322.

<sup>148</sup> *Id.*

In order to facilitate these corrective measures and restore integrity and stability to nature and farmers, it is crucial to first acknowledge the inadequacies with the current system. PGR ownership was not contemplated in the social or legal framework prior to the 1980s. Unelected officials severed the sacred bonds between the farmer and the seed based on the interpretation of the Patent Act. Prior to these developments in the United States, governments, including the United States, allowed for open access to PGRs for farming, research and development. Although pre-1980s U.S. policy may not have explicitly embraced the term “common heritage of humankind,” PGRs were recognized as things of nature and not as the property of individuals.<sup>149</sup> The global community has not been mute on the ethical imperative of reform; some suggestions for potential solutions to the current system have been made.

One such suggestion came from a group of experts on biological diversity assembled by the United Nations Environment Program (UNEP) in November 1988.<sup>150</sup> The group was to address the international community about biological diversity and was charged with considering "the need to share costs and benefits between developed and developing countries" as well as "ways and means to support innovation by local people."<sup>151</sup>

The Convention on Biodiversity (“CBD”) was opened for signature on June 5, 1992, at the United Nations Conference on Environment and Development (the Rio “Earth Summit”). The panel of experts produced a structural guideline to help establish a general principle of fairness.<sup>152</sup> Article 1 states, “The objectives of this Convention... are the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources, including by appropriate access to

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<sup>149</sup> Aoki, *supra* note 2 at 131 (quoting Steve Brush, explaining that the common heritage principle saw PGRs as “belonging to the public domain and not owned or otherwise monopolized by a single group or interest.”)

<sup>150</sup> Convention on Biodiversity, [www.cbd.int/history](http://www.cbd.int/history) (last visited 04/15/2010).

<sup>151</sup> *Id.*

<sup>152</sup> *Id.*

genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding.”<sup>153</sup> At the heart of Article 1 are equity and sustainability.

The principle set out in Article 3 is as follows: “States have... the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.”<sup>154</sup> Article 3 places PGRs back in the hands of sovereign countries.

The CBD proposal was not necessarily intended to deliver PGR ownership to sovereign countries, but rather to put states in the position of trustee over PGRs that are found within its borders and to dually ensure that industries utilizing state-specific species would enrich the countries of origin in return.<sup>155</sup> PGRs are natural, living things that are being exploited by industry at the expense of farmers narrowly, and the rest of civilization in broader sense. The primary objective of governments around the world is protection of its citizens and the CBD proposal allows governments to do just that. To implement the policy, the proposal would need to become binding law by treaty. Although treaties are often difficult to ratify in the United States, states in the Southern hemisphere have considerable leverage due to the cache PGRs which are predominately located in the those respective regions.

Once the PGRs are back in control of sovereign states, as they once were, the corporations will still be able make patent claims and assert contract rights within each country. However, if the CBD proposal is adopted into law and the sovereign state is seen as trustee of its

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<sup>153</sup> Convention on Biodiversity, [www.cbd.int/convention](http://www.cbd.int/convention), Text of Convention on Biodiversity, Article 1 (last visited 03/15/2010).

<sup>154</sup> *Id.* at Article 3.

<sup>155</sup> Koons, *supra* note 133 at 320.

PGRs for the benefit of the citizens, a common law doctrine known as the public trust doctrine may be applicable to wrest control over PGRs away from corporations and back into citizen's hands.

The public trust doctrine has its origins in Roman law and has made appearances throughout history in England and the United States.<sup>156</sup> The principle behind the doctrine is that the government holds legal title to the resources of the earth in trust for the benefit of its citizens.<sup>157</sup> In Roman law, the resources that were guarded were traditionally the air, rivers, sea, and the seashore.<sup>158</sup> Likewise, the English tradition was founded on this common law principle and codified by Parliament in order to keep the Crown from giving individual citizens title to public rights of egress and regress for fishing, trading and other uses claimed and used by citizens.<sup>159</sup>

Like many common law traditions, the public trust doctrine made its way to the United States and has been found as far back as colonial enactments.<sup>160</sup> The duty to hold certain lands in trust for the people was bestowed upon the individual states of the Union after the United States won independence from Great Britain.<sup>161</sup> That is not to say, however, that the federal government could not apply the public trust doctrine itself. The U.S. Constitution specifically gives Congress the power to regulate commerce among the several states and to dispose of and make all necessary rules and regulations regarding territory or property belonging to the United States.<sup>162</sup>

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<sup>156</sup> Joseph L. Sax, *The Public Trust Doctrine in Natural Resource Law: Effective Judicial Intervention*, 68 Mich. L. Rev. 471, 475 (1970).

<sup>157</sup> *Id.*

<sup>158</sup> *Id.*

<sup>159</sup> *Id.* at 476 (describing an English statute which codified the public trust doctrine.)

<sup>160</sup> *5-10 Treatise on Environmental Law* §10.05 (2010).

<sup>161</sup> *Id.*

<sup>162</sup> U.S. Const. amend. I § 8, cl. 3 ; U.S. Const. amend IV § 3, cl. 2.

A primary example of the public trust doctrine in action is illustrated by *Illinois Central Railroad Co. v. Illinois*, 146 U.S. 387 (1892). The state of Illinois passed a legislative act on April 16, 1869, granting 1000 acres of submerged land beneath Lake Michigan, which was the Chicago waterfront and harbor. The Illinois legislature then passed another declaration on April 15, 1873, which repealed the 1869 agreement. The railroad, being a fairly powerful industry in the latter 19th century, believed that its property rights were being violated and filed suit.

The question the Court was faced with was whether the 1869 legislature was competent to deprive the State of its ownership of the submerged lands in the harbor. The Court sided with the State using the public trust doctrine for its theoretical underpinnings.<sup>163</sup>

Any grant of the kind is necessarily revocable, and the exercise of the trust by which the property was held by the State can be resumed at any time. Undoubtedly there may be expenses incurred in improvements made under such a grant which the State ought to pay; but, be that as it may, the power to resume the trust whenever the State judges best is, we think, incontrovertible.<sup>164</sup>

The Court argued that certain resources are held in trust for the people, and the transfer of those resources to a company would be just as intolerable as the transfer of those resources to some other foreign state to control. The inherent value of the Chicago harbor was defended, “the idea” the Court stated, “that its legislature [could] deprive the State of control over its bed and waters and place the same in the hands of a private corporation created for a different purpose... is a proposition that cannot be defended.”<sup>165</sup>

It is obvious that PGRs are not as tangible as waterways; nevertheless, it is equally intolerable for the laws of a state to deprive its citizens of access to PGRs. In fact, if those who created the public trust doctrine could comprehend modern technological feats, it is only logical

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<sup>163</sup> *Id.* at 452.

<sup>164</sup> *Id.* at 455.

<sup>165</sup> *Id.* at 454.

to presume its application would have been extended to PGRs.<sup>166</sup> There is unquestionably nothing more common to the heritage of humankind than the cumulative domestication of plants which has produced the very resources which are now being hoarded by private industry. Just as the legislature wrongly assigned the railroad rights to control the Chicago harbor, the legislature of the 1980s failed to correct the Supreme Court decisions allowing patent protection for living organisms.

The CBD proposal should be adopted to acknowledge PGRs as essential building blocks of all sovereign nations. Industry should be prevented from exploiting PGRs just as it is prevented from owning other common resources. Furthermore, it is a moral imperative to prevent industry from further exploiting developing nations' resources and then selling them back attached with coercive agreements and unconscionable mandates.

The case for change is only strengthened by a retrospective glance through history and reuniting oneself with the concepts of the agrarian mind. Berry's *The Whole Horse: The Preservation of the Agrarian Mind* is not merely a historical account of what *was*, it is a warning to an alienated people about what *is*. It is beneficial to look back through history and consider that not so very long ago, seeds and PGRs could not be fully patented. Justice Douglas once wrote, while denying a patent application for a living organism, "patents cannot issue for the discovery of the phenomena of nature... The qualities of these bacteria, like the sun, electricity, or the qualities of metals, are part of the storehouse of knowledge of all men. They are manifestations of laws of nature, free to all men and reserved exclusively to none..."<sup>167</sup> The paradigmatic shift that occurred in the 1980s, the idea of life-ownership, is not absolute. Certain rights are derived from nature but other rights, like property rights, are secured only through the

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<sup>166</sup> Carolyn Raffensperger, *The Law of Sharing: Setting a Policy and Legal Agenda for the Commons*, Science & Environmental Health Network: The Networker Oct. 2007. [www.sehn.org/volume\\_12-5.html](http://www.sehn.org/volume_12-5.html).

<sup>167</sup> Funk Bros. Seed Co. v. Kalo Inoculate Co., 333 U.S. 130, 131 (1948).

government. Dr. Vandana Shiva notes, “[p]atent protection transforms farmers into suppliers of free raw material, displaces them as competitors, and makes them totally dependent on industrial supplies for vital inputs such as seed.”<sup>168</sup> Just as the public trust doctrine was utilized to wrestle valuable property away from the railroad, so too should it be used to release PRGs back into the public trust so that the true beneficiaries may freely enjoy that which was made from the common heritage of humankind.

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<sup>168</sup> Shiva, *supra* note 92 at 54.