

# A Monsanto-Bayer Merger

**Will Raise the Price of Agricultural  
Inputs, Reduce Seed Choices and  
Increase Costs for U.S. Farmers**

WHITE PAPER | DECEMBER 2017



History shows that market concentration comes at the expense of farmers.



**T**he merger of seed giant Monsanto and global agrochemical powerhouse Bayer was proposed in the fall of 2016 and is currently under review by both the European Commission, Brazil and the U.S. Department of Justice (DOJ). Although the merger is characterized as a Bayer acquisition of Monsanto, a May 10, 2016 letter from Bayer’s management to Monsanto CEO Hugh Grant suggests that Monsanto initiated the merger as an opportunity to combine seeds, traits, crop protection biologics and digital farming into a single “globally integrated agricultural platform.”<sup>1</sup>

An integrated platform combining these functions is only possible due to advances in genetic engineering, resulting in seeds with greater resiliency and higher yields. Seeds are increasingly being engineered with traits that correspond to specific agricultural inputs. Thus, a seed engineered with a specific herbicide tolerance is designed to be farmed using that specific herbicide. An herbicide designed to kill weeds specific to a region with low precipitation is intended to be used with specific drought-resistant seeds.

The result of these crop innovations has been greater integration of the seed and agricultural chemical (agrochemical) markets and tighter consolidation of the entire agriculture industry which, research shows, has already led to significantly higher seed prices.



**1**

**The Monsanto-Bayer merger would raise seed prices for farmers through:**

- » **unprecedented integration, of the seed, seed trait and agrochemical markets**
- » **anti-competitive market concentration**
- » **exploitation of cross-licensing agreements**
- » **using “tying and bundling” to create a vertical monopoly**
- » **reducing agricultural innovation**

**2**

**Monsanto’s decade-long collaboration with BASF raises serious questions about Bayer’s divestiture of its seed and herbicide assets, and whether divestiture would actually enhance Monsanto’s control of global markets.**

**3**

**The proposed merger is projected to raise aggregate seed prices by 5.5%, but could raise cottonseed prices by more than 20%.**

**4**

**On average, farmers currently using Monsanto brand cottonseed will see their seed prices increase by 19.23%.**

**5**

**On average, farmers currently using Bayer brand cottonseed will see their seed prices increase by 17.41%.**



# 1

## MARKET CONSOLIDATION HAS INCREASED SEED PRICES

The merger of Monsanto and Bayer would create a single company with the largest share of the global market for all grain seeds and the seeds of a substantial number of vegetables, like broccoli, green beans, carrots and onions.<sup>2</sup> The new company would control more than a third of the global market for corn seed, nearly 70% of the global market for cottonseed and up to 69% of U.S. approved herbicide-tolerant seeds for alfalfa, canola, corn, wheat, soybean and cotton.<sup>3</sup>

History shows that market concentration comes at the expense of farmers. As the market for agricultural inputs has consolidated, seed prices for farmers have *more than doubled* relative to the prices they receive for the resulting crops.<sup>4</sup>

Before 1990, the world's farmers typically purchased seeds with traits amenable to their growing conditions from any of 600 or more small, independent seed businesses, many of them family-owned.<sup>5</sup> During the 1990s, however, multinational seed, pharmaceutical and agrochemical companies began rapidly acquiring some of the smaller companies and entering into joint ventures with others. Between 1996 and 2006, the number of independent seed companies decreased to fewer than 250.<sup>6</sup> By 2009, only about 100 remained.<sup>7</sup>

Meanwhile, the global seed market became increasingly concentrated in the hands of four large companies—Monsanto, Bayer, Syngenta and DowDuPont. In 1994, the top four seed companies accounted for only about 21% of total worldwide commercial seed sales. By 2009, the top four companies accounted for more than 54% of all sales.<sup>8</sup>

The rapid consolidation in the commercial seed market coincided with a transition among farmers around the world from conventional seeds to seeds with genetically-engineered traits—like herbicide tolerance and insect

resistance. First sold commercially in 1995, “traited” seeds rapidly became the seeds of choice for many commercial farmers.<sup>9</sup> Since 2006, traited seeds have constituted more than 40% of all proprietary seeds sold worldwide.<sup>10</sup>

As demand for genetically-engineered seeds has grown, the market for seed traits has consolidated almost as rapidly as the seed market itself. Initially, market for seed traits was comprised of dozens of small and mid-sized biotechnology research firms. Throughout the mid-2000s, however, as more of these small and mid-sized firms merged with large seed or agrochemical companies, the number exiting the market began surpassing the number entering.<sup>11</sup> By 2008, just over 30 small or mid-sized crop biotechnology firms remained.<sup>12</sup>

With the consolidation and integration of the seed, trait and agrochemical industries, the price for agricultural inputs increased dramatically. From the introduction of traited seeds in 1994 to 2010, seed prices for farmers more than doubled relative to the prices farmers received for their crops, according to the U.S. Department of Agriculture (USDA).<sup>13</sup>

Fees for genetic traits were largely to blame for the increase. The USDA determined that 32% to 74% of the price increase for corn, soybean,

## BY THE NUMBERS

**100%**

Portion of the world's stacked cotton and soybean seeds that contained one or more Monsanto traits by 2009

**18%**

Estimated increase in cottonseed prices as a result of substantial consolidation of the agrochemical market

**<\$800K**

Combined increase in the R&D budget for both companies

**70%**

of cottonseed planted throughout the U.S. that would be controlled by the merged company

**350**

Number of BASF R&D jobs aimed at increasing crop yields and tolerance eliminated

**34%**

Average farm's per-acre operating costs constituted by corn seed expenses

**60%**

Net profits Monsanto pockets from products developed jointly with BASF

cotton and sugar beet seeds reflected technology fees and seed treatments associated with genetic traits.<sup>14</sup>

Farmers have witnessed the steepest price increases in agricultural inputs for three major cash crops—corn, soybeans and cotton—all of which are overwhelmingly grown using seeds with genetically-engineered traits.<sup>15</sup> These three crops account for half of the total farmland used for crops in the U.S.

### **Corn**

Between 1975 and 1996, corn farmers generally spent from 4% to 11% of crop receipts on seeds, representing no more than 15% of the total operating costs of a typical farm.<sup>16</sup> By 2009, corn seed expenses had risen to 19% of crop receipts for the average farm and constituted as much as 34% of a farm's per-acre operating costs.<sup>17</sup>

### **Soybeans**

Until 1997, soybean farmers spent between 4% and 8% of the income from their crops on seeds.<sup>18</sup> By 2009, soybean farmers spent more than twice that amount—an estimated 16.4% of crop income—on seeds.<sup>19</sup> Farmers planting Monsanto's Roundup-Ready 2 soybeans spent even more—22.5% of every acre's gross income—on purchasing Monsanto's seeds.<sup>20</sup>

### **Cotton**

While the price of cottonseed doubled between 1975 and 1997, that increase has been dwarfed by inflation in cottonseed prices since the introduction of traited seeds.<sup>21</sup> Between 1997 and 2001, traited cottonseeds expanded from 15% of all U.S. cotton acreage to over 37%.<sup>22</sup> By 2017, they comprised over 85% of all cotton acreage in the U.S.<sup>23</sup> At the same time, the price of traited cottonseeds has risen eightfold, from \$73 to about \$589 per hundred pounds.<sup>24</sup>



---

## **HOW THE MONSANTO-BAYER MERGER WOULD DRIVE FURTHER PRICE INCREASES**

Monsanto is already the world's largest seed seller.<sup>25</sup> A merged Monsanto-Bayer would control over 35% of global market for corn seeds, roughly 28% of the global soybean market, and almost 70% of the global cottonseed market.<sup>26</sup>

A merged Monsanto-Bayer would also be the world's largest agrochemical company, constituting roughly one-quarter of the global market and reaping annual revenues of more than \$67 billion.<sup>27</sup>

Monsanto also dominates the market for crop protection and herbicide resistance traits for corn, cotton and soybean crops grown in the United



States.<sup>28</sup> In 2009, 77% of all U.S. acres of cotton, 82% of all its acres of corn, and 95% of all its acres of soybeans were planted with seed varieties containing Monsanto traits.<sup>29</sup>

Although the U.S. Department of Justice (DOJ) won a consent decree in 2007 to prevent Monsanto from using its market position to reduce competition, Monsanto has continued to dominate the market for traited seeds. By 2016, Monsanto seed traits could be found in 80% of America's corn acreage and more than 90% of its soybean acreage.<sup>30</sup>

The following section describes how a new Monsanto-Bayer entity would result in higher seed prices for farmers through unprecedented market integration, anti-competitive market control, exploitation of cross-licensing agreements, creation of a vertical monopoly through “tying and bundling,” and reduced innovation.

## **Unprecedented Market Integration**

The merger of Monsanto and Bayer would not only further consolidate the markets for traited seeds and agrochemical products but also result in the unprecedented integration of these two markets.

While Monsanto dominates the market for many traited seeds, by 2015 it held only an 8.5% share of the global market in agricultural chemicals.<sup>31</sup> Bayer, on the other hand, lags far behind Monsanto in global sales of traited seeds, but accounts for more than 16.5% of the agrochemicals market.<sup>32</sup> A merged Monsanto-Bayer would be not only the world's largest seed seller, but one of its largest agrochemical companies, controlling over one-quarter of the global market in agricultural herbicides, insecticides, fungicides and nematicides.<sup>33</sup>

In September 2016, researchers from Texas A&M's Agricultural and Food Policy Center published a working paper evaluating the impact on seed prices of various mergers and acquisitions in the agrochemical industry.<sup>34</sup> Because of the large sunk research costs and intellectual property protections of the dominant players in the crop seed market, researchers found "substantial barriers to entry" for new competitors. Given the lack of market contestability, they concluded that "competitive pressures will constrain price markups less than they would in contestable markets," resulting in a markup in seed prices by the largest firms.<sup>35</sup>

A model based on these assumptions determined that substantial consolidation of the agrochemical market would raise corn seed prices by 2.3%, soybean seed prices by 1.9%, and cottonseed prices by roughly 18.2%.<sup>36</sup>

According to the Center's calculations, after the Monsanto-Bayer merger, farmers currently using Monsanto's brands of cottonseed should expect seed prices to rise by 19.23% on average, and those using Bayer's brands can expect price increases around 17.41% on average.<sup>37</sup> Moreover, the Center's calculations revealed a 75% probability that the seed prices of both companies would increase by almost 14% on average, and a 25% probability that combined seed prices would rise by over 20% on average.<sup>38</sup>

### **Anti-Competitive Market Control**

The merger of Monsanto and Bayer would give the merged company a level of market control that U.S. courts have already rejected as anti-competitive.

Prior to 2006, over 96% of cottonseed planted in the U.S. contained traits developed by Monsanto, which sold traited cottonseed through its Stoneville Pedigree Seed Company.<sup>39,40</sup> When Monsanto proposed to merge with the Delta & Pine Land Company (DPL) in 2007, the Department of Justice (DOJ) worried that the resulting entity would exercise too much control of the American cottonseed market, especially in America's critical cotton-growing regions.<sup>41</sup> At the time, DPL sold 79% of all traited cottonseed in the MidSouth (Mississippi, Arkansas, Louisiana, Missouri and Tennessee) and 87% of all traited cottonseed in the Southeast (Alabama, Georgia, Florida, the Carolinas and Virginia).<sup>42</sup>

After the merger with DPL, Monsanto would have accounted for *more than* 95% of traited cottonseed sales in the MidSouth and *at least* 95% of sales in the Southeast.<sup>43</sup> The DOJ determined that the resulting elimination of competition would likely result in farmers having "fewer choices of, and face higher prices for, traited cottonseed."<sup>44</sup>

To protect American farmers from this anticompetitive market, the DOJ required Monsanto to divest its interest in 20 of DPL's proprietary cottonseed lines and all of its interests in Stoneville.<sup>45</sup> Monsanto summarily sold Stoneville to Bayer, the same company with which it now seeks to merge.<sup>46</sup>

# The proposed Monsanto-Bayer merger will more than quadruple the acceptable HHI score for maintaining fair competition.



In 2015, Monsanto's cottonseed was the most popular brand planted in the U.S., accounting for 31.2% of the country's total cotton acres.<sup>47</sup> Bayer's Fibermax brand was the second most popular brand, accounting for 21.6% of U.S. cotton acres.<sup>48</sup>

The third most popular brand of cottonseed sold in the U.S. in 2015, accounting for nearly 17% of the country's entire cotton acreage, was Bayer's Stoneville brand\*, the same brand that the DOJ required Monsanto to divest before the company merged with DPL in 2009.<sup>49</sup>

By merging with Bayer, Monsanto not only would control the same cottonseed brand it was forced to divest, but the merged company would account for roughly 70% of the cottonseed planted throughout the U.S.<sup>50</sup>

U.S. courts routinely use the Hefindahl-Hirschman Index (HHI) to measure market concentration and determine whether a particular market

\* In 2017, Monsanto's Deltapine retained the top spot as the most popular cottonseed, with nearly 36% of the market, according to the USDA's report on Cotton Varieties Planted 2017 Crop. With 14.36%, Americot, however, overtook Bayer (14.19%) as the second most popular brand largely on the strength of the company's XtendFlex technology, which it introduced in its much anticipated NextGen variety in the 2016 season. See Beck Barnes, "2016 Seed Showcase – Americot," *Cotton Grower*, November 13, 2015, available at <http://www.cottongrower.com/cotton-news/product-news/2016-seed-showcase-amicot/>

Nothing would restrict a merged Monsanto-Bayer from exploiting cross-licensing agreements or placing stacking restrictions on its seeds to unacceptably reduce competition.



is competitive.<sup>51</sup> Although an HHI score can range from zero to 10,000, the federal appeals court for the D.C. Circuit has determined that any merger which increases the HHI score of a market by more than 510 points is presumed on its face to threaten fair competition.<sup>52</sup>

According to the U.S. Department of Agriculture, the proposed Monsanto-Bayer merger will increase the HHI score of the U.S. cotton market by over 2400 points, more than quadruple the acceptable score for maintaining fair competition.<sup>53</sup>

### **Exploitation of Cross-Licensing Agreements**

Monsanto has been able to control the market for seeds in certain crops by using licensing agreements to ensure that every strain of seed currently in use contain a Monsanto trait, which empowers the company to extract fees from competitors and attempt to block competitors from developing seeds that combine or “stack” their traits with Monsanto’s.

Monsanto’s licensing agreements typically restrict their licensees from working with other trait developers and often threaten to impose severe penalties for stacking a competitor’s traits alongside Monsanto’s without first obtaining a licensing agreement.<sup>54</sup> As a result, by 2009, over half of all “stacked” seeds worldwide included Monsanto traits.<sup>55</sup> While a majority of all seeds carried Monsanto traits, the company’s traits dominated the stacked seeds of certain crops. For example, by 2009, roughly 60% of the

world's stacked corn seeds and 100% of its stacked cotton and soybean seeds contained one or more Monsanto traits.<sup>56</sup>

Since Monsanto owns the patent on its seed traits, it can reject cross-licensing agreements with other seed developers or dictate the terms under which it enters such agreements.<sup>57</sup> When the DOJ considered Monsanto's request to merge with DPL, it concluded that this unfettered control of cross-licensing conditions was anti-competitive and required Monsanto to permit stacking of cottonseed traits without penalty for 10 years.<sup>58</sup> However, the DOJ's demand only covers cottonseeds and expires after 2018.<sup>59</sup> Thus, nothing would restrict a merged Monsanto-Bayer from exploiting cross-licensing agreements or placing stacking restrictions on its seeds to unacceptably reduce competition.

Moreover, the costs of cross-licensing restrictions imposed by a merged Monsanto-Bayer would make the cost of market entry prohibitively high for potential competitors because, in addition to all the research and development costs associated with bringing a rival seed trait to market, any new competitors would be required to pay Monsanto-Bayer a license fee to stack their traits within existing seed strains.<sup>60</sup> If a competitor, for example, developed a trait that allow corn to grow at normal yields using half the irrigated water, the competitor might be prohibited—either directly or through hefty licensing fees—from bringing the trait to market in seeds that also contained tolerance for either Monsanto's Roundup or Bayer's Liberty herbicide.

Increasingly, the integrated market for agricultural inputs means farmers will be locked into the entire product line—from herbicides and crop protection traits, to insecticide and new “digital agriculture” platforms—that a merged Monsanto-Bayer may offer as soon as he or she makes the decision to plant the merged company's seeds.<sup>61</sup> To hope to compete independently in such a concentrated market, new competitors not only would have to spend many years and tens of millions of dollars developing expertise in breeding seed varieties, they would also have to invest equally as much time and money gaining expertise developing herbicides and insecticides and seed traits to make crops resistant to them.<sup>62</sup>

## **Vertical Monopoly Through Tying & Bundling**

By bundling together seed traits, agrochemicals and new “digital agriculture” platforms, a merged Monsanto-Bayer would be able to control the entire supply chain for agricultural inputs. While this may result in discounts on some inputs, it would force farmers to pay higher prices on others.

These effects are already evident in Monsanto's bundling of its Roundup products. By bundling its higher-priced Roundup herbicides with the purchase of its Roundup-tolerant seeds, Monsanto has been able to more than compensate for any discounts offered on the price of Roundup Ready seeds.<sup>63</sup>

Monsanto is also using this bundling strategy to assert market control over new “digital agricultural” platforms, the software and applications allowing commercial farmers to access and understand real-time data on climate, soil and irrigation conditions. The company acquired San Francisco based Climate Corporation, which is building a network of in-field sensors that will feed data to digital agriculture tools available only on Monsanto’s FieldView platform.<sup>64</sup>

Monsanto announced plans to open the platform to developers to create their own applications, much as Apple opened the iPhone to independent application providers. But, once FieldView has become the central hub for soil and weather data from sensors, growth meters and satellites, a merged Monsanto-Bayer would monetize the “open” platform by charging subscriptions that increase in price as more of the merged companies’ technologies are integrated.<sup>65</sup>

A free subscription to FieldView Prime, for example, provides farmers with field-level weather data and a scouting tool that captures geo-specific notes and images. Farmers that want to access digital maps with field-level data on elevation, topography, draining and soil condition projections, however, will have to purchase Monsanto-Bayer’s mid-level FieldView Plus and install a device the size of a hockey-puck near their tractor’s controller area network (CAN), which also sends data back to the merged company via the cloud.<sup>66</sup>

The top tier of the Monsanto-Bayer digital agriculture platform, FieldView Pro, will offer in-season and historical field imaging and remote sensing data gathered from fly-over satellites, Doppler radar stations and drones down to the level of field rows. All of this data will be offered with variable-rate seeding prescriptions based on the agricultural input products offered by the merged Monsanto-Bayer.<sup>67</sup>

Monsanto’s merger with Bayer will only enhance its ability to increase the price of agricultural inputs through tying and bundling. Bayer’s herbicide “Liberty” and its Liberty-tolerant “Liberty Link” seed are currently the direct competitors of Monsanto’s Roundup herbicides and Roundup Ready seeds.<sup>68</sup> The merger could give the resulting Monsanto-Bayer company control over the entire chain of agricultural inputs for both the leading herbicide and herbicide-tolerant seed and its direct competitor, with the power to dictate the price of any single input—seed, trait, herbicide, pesticide, or digital platform subscription.

(While Bayer has announced its intention to divest its Liberty product line in anticipation of the merger, the merged company is likely to retain control of both Roundup and Liberty products through Monsanto’s collaboration with BASF. This scenario is covered in more detail below.)



The merger would likely concentrate R&D efforts on enhancing existing technologies rather than groundbreaking innovations.



### Reduced Innovation

The merger of Monsanto and Bayer would likely reduce both the total amount both companies spend on R&D, and concentrate their R&D efforts on enhancing existing technologies rather than producing groundbreaking innovations.

Bayer claims that a merger with Monsanto would lead to shared intellectual property and expand both companies' research and development (R&D) activities.<sup>69</sup> But, even using the companies' own projections, the combined increase in R&D funding amounts to less than \$800,000 a year for the first six years of the merger, out of a combined annual R&D budget close to \$7 billion.<sup>70</sup>

It is more likely that further consolidation would reduce both the total amount the companies spend on agricultural R&D as well as its quality. Currently, five companies are responsible for over 74% of all agrochemical R&D.<sup>71</sup> An exhaustive study by the U.S. Federal Trade Commission (FTC) suggests that high levels of market concentration strongly correlate to lower industry innovation.<sup>72</sup> By consolidating the market even further, a Monsanto-Bayer merger would likely concentrate agrochemical innovation in a handful of firms, reducing the number of independent research laboratories, decreasing parallel R&D paths and eliminating head-to-head R&D competition.<sup>73</sup>

Some evidence of this reduction is already apparent. Ahead of the announcement that Bayer would be divesting its cottonseed assets and Liberty Link seed trait system to BASF Group (BASF), BASF announced



that it was eliminating half of its plant science R&D program and slashing more than 350 research jobs.<sup>74</sup> The merger is already threatening to divert R&D resources Bayer would have otherwise put toward development of promising, new pharmaceuticals.<sup>75</sup>

A Monsanto-Bayer merger is likely to decrease the total number of independent research and development laboratories, as parallel R&D paths are combined.<sup>76</sup> As R&D budgets are merged, there is a documented tendency among larger firms to focus innovations on the narrow range of crops and technologies with the highest commercial returns.<sup>77</sup> For example, as the industry has consolidated, as much as 40% of all private crop breeding R&D is now focused on a single crop: corn.<sup>78</sup>

As agricultural R&D becomes concentrated into a handful of large firms there is a greater incentive for large market players to focus their efforts on boosting sales of existing technologies rather than actively pursuing promising new avenues.<sup>79</sup> Consider, for example, how Monsanto responded to the imminent expiration of its patent on the glyphosate-based Roundup herbicide. The company spent billions developing Roundup Ready 2—a second-generation glyphosate system—rather than developing an entirely new herbicide.<sup>80</sup>

Monsanto's history of stifling the R&D of its competitors also does not bode well for continued agrochemical innovation after the company merges with Bayer. For over a decade, Monsanto has explicitly forbidden anyone purchasing its seeds from using them for independent research, threatening litigation against scientists that might explore how seeds containing Monsanto traits compare with other seeds under different conditions, or examine the unintended environmental side effects of Monsanto's genetic modifications.<sup>81</sup>

As consolidation reduces the breadth of agricultural R&D, the resulting contraction decreases the development of innovations targeted to specific local and regional environments.<sup>82</sup> As a result, farmers have fewer quality options and must purchase more expensive seed systems containing redundant stacked traits, many of which are of no direct benefit to them.<sup>83</sup>

Of even greater concern is that, over time, the slower development of beneficial seed traits will result in farmers losing yield growth per acre, which will reduce their income even as they are forced to spend more on agricultural inputs.<sup>84</sup>

---

## THE BASF DIVESTITURE SHELL GAME

Bayer's attempt to divest interests in traited seeds and its Liberty Link seed system is merely a shell game that could ultimately hand the merged Monsanto-Bayer company greater control of the global agrochemical market.

After top agrochemical giant Syngenta rejected an offer to merge with Monsanto in November of 2015, it was widely rumored that Monsanto approached the German companies Bayer and BASF—the second and third-ranked global agrochemical companies, respectively—to inquire about purchasing their pesticide assets.<sup>85</sup> Although Bayer ultimately made an offer to acquire Monsanto, as late as March 2017, Monsanto had shown a preference for merging with BASF instead.<sup>86</sup>

Because Bayer purchased Monsanto's Stoneville cottonseed interests, a Monsanto-Bayer merger would rejoin Monsanto and Stoneville, creating the very conditions for anti-competitive market control that forced Monsanto to divest from Stoneville in the first place, an outcome that would give the merged entity control over 70% of the cottonseed market and likely draw critical attention from the DOJ and international regulators.<sup>87</sup>

To address potential antitrust concerns, Bayer has signed an agreement to sell its global cotton interests—including the Stoneville cottonseed strains it acquired from Monsanto—to BASF†.<sup>88</sup> Along with the Stoneville cottonseed strains and the majority of Bayer's North American interests in traited canola and soybean seeds, the agreement would transfer to BASF Bayer's Liberty herbicide and Liberty Link seed system, the major competitor to Monsanto's Roundup and Roundup Ready seed package.<sup>89</sup>

BASF has historically stayed out of the seed business, focusing instead on developing agricultural chemicals. But, in June 2017, BASF CEO Martin Brudermueller indicated that the company might be interested in seed assets brought to market “for antitrust reasons.”<sup>90</sup>

---

† Interestingly, Bayer acknowledges in a press release that it requires the net proceeds from the divestiture with BASF to partially finance its planned acquisition of Monsanto.



While Monsanto's initial interest in acquiring BASF was believed to be an effort by Monsanto to expand its development of agrochemicals, there is speculation among investors that, following the company's failed attempt in 2015 to acquire Syngenta, Monsanto may be looking to expand its collaboration with BASF to focus on development of traited seeds rather than agricultural chemicals.<sup>91</sup>

On its face, Bayer's divestiture of its cottonseed interests prior to a merger with Monsanto would appear to avoid concerns about anti-competitive concentration in the global cottonseed market. However, Monsanto's decade-long collaboration with BASF raises serious questions about whether *Bayer's sale would reduce or enhance Monsanto's control* of the global cottonseed market.

### **BASF's Traitied Seed Development Program is a Fully-Owned Subsidiary of Monsanto**

Since 2007, Monsanto and BASF have engaged in joint research and development of traited corn, soy, canola and cotton seeds, a partnership that was expanded in 2010 to include the development of wheat seeds as well.<sup>92</sup> Under a collaborative agreement, each company nominates from its own research programs candidate genes for accelerated development through a joint R&D program funded with as much as \$2.5 billion in contributions from both companies.<sup>93</sup>

However, under the cooperative agreement, BASF's traitied seed development program functionally operates as a fully-owned subsidiary of Monsanto. Only Monsanto is permitted to commercialize any products that emerge from the collaboration.<sup>94</sup> Under the agreement, moreover, Monsanto pockets 60% of the net profits from any jointly-developed products.<sup>95</sup>

The cooperative agreement also includes stacking Monsanto herbicide resistance traits with BASF traits designed to increase crop yields and protect against certain environmental stresses.<sup>96</sup> As a result, any seed products developed with BASF are likely to be subject to cross-licensing agreements with Monsanto. For example, Monsanto and BASF jointly developed a next generation herbicide tolerant crop system involving the herbicide dicamba. While the herbicide formulation was proprietary to BASF, the trait for dicamba tolerance in soybean, corn, canola and cotton seeds was proprietary to Monsanto.<sup>97</sup>

As glyphosate-resistant weeds are becoming more prevalent, the Roundup Ready seed system is reaching the end of its commercial life cycle and Monsanto is expected to quickly transition to a dicamba-based seed system, starting with stacked corn and soybean seeds.<sup>98</sup>

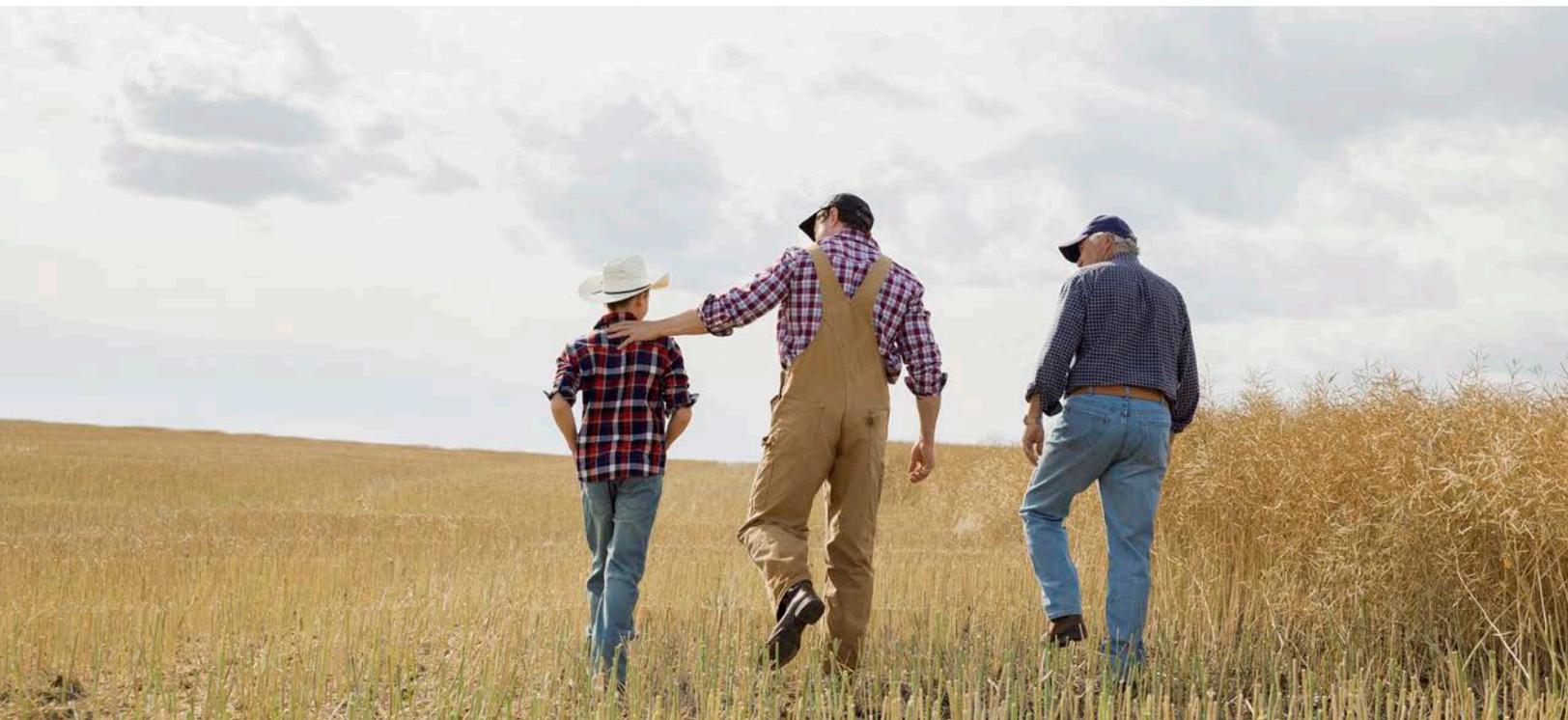
In 2014, the Environmental Protection Agency (EPA) approved dicamba for use in the U.S.<sup>99</sup> Monsanto started developing soybean and cotton seeds stacked with both resistance to Monsanto's glyphosate-based Roundup herbicide and resistance to dicamba—the herbicide Monsanto

jointly developed with BASF—making the resulting Roundup Ready 2 Xtend seed system available to farmers as early as 2017.<sup>100</sup>

Bayer’s glufosinate-based Liberty herbicide (and Liberty Link seed system) competes directly with both Monsanto’s Roundup Ready seed systems and the more recent dicamba-based Xtend traits Monsanto developed jointly with BASF.<sup>101</sup> Thus, should Bayer sell its Liberty assets to BASF, there is a good likelihood that the company will commercialize a seed system stacked with both tolerance to dicamba and to Bayer’s Liberty herbicide. As a result, Bayer’s divestiture would *effectively integrate rather than separate* the two largest competitors of herbicide resistant seeds.

Prior to its merger with Monsanto, DPL was among the few companies that offered to develop seeds “stacked” with both Monsanto’s and a competitor’s traits.<sup>102</sup> Thus, a company that had developed an insect-resistance trait, for example, could bring the trait to market in DPL cottonseed that also contained the trait for making the cottonseed tolerant to Monsanto’s Roundup Ready herbicide. However, recognizing how DPL’s merger would permit Monsanto to integrate its seed traits with those of its competitors, the DOJ made Monsanto divest many of its cottonseed interests as a condition for approving the merger.<sup>103</sup>

While one can only speculate on the nature of BASF’s future collaboration with a merged Monsanto-Bayer, BASF’s recent restructuring of its plant science operations may provide indications of its plans. Ahead of the announced purchase of Bayer’s seed assets, BASF revealed that it was cutting its research and development of plant biotechnology by 50%, eliminating roughly 350 jobs involving R&D projects aimed at increasing crop yields and tolerance, especially for corn and soybeans, which were the first crops to have commercially-available seeds stacked with resistance both to Monsanto’s Roundup herbicide and its more recent dicamba-based herbicide.<sup>104</sup>



Not only do the job cuts at BASF evince that its collaboration with Monsanto—and, thus, any entity to emerge from the Monsanto-Bayer merger—will result in a net reduction in plant science research and development, they also suggest that BASF does not intend to pursue development of new herbicide tolerance traits to compete with the dicamba system it developed with Monsanto.

If BASF intends to stack dicamba tolerance with the Liberty seed system, Bayer's sale would result in the two largest seed trait competitors integrating under a common herbicide system, effectively undermining the intended purpose of Bayer's divestiture. Consequently, even if BASF does not continue its close collaboration with Monsanto after the merger with Bayer, farmers are already likely to face the same reduced choices and higher seed prices that the DOJ sought by forcing Monsanto to divest prior to its merger with DPL.



## IMPACT ON FARMERS

Expanded output by foreign competition and a global glut in many key crops has halved U.S. crop prices over the past three years, making American farmers particularly vulnerable to higher prices for seeds, fertilizer and agricultural chemicals.<sup>105</sup> U.S. farmers saw their net income drop 45% between 2013 and 2016, and expect their income to drop a further 8.7% in 2017, according to the U.S. Department of Agriculture.<sup>106</sup>

Further concentration of the seed, trait and agrochemical markets will leave farmers with fewer choices and higher prices.<sup>107</sup> According to the International Panel of Experts on Sustainable Food Systems, further concentration in the market for agricultural inputs will increase aggregate seed prices by up to 5.5%.<sup>108</sup>

Seed costs are the highest expense for farmers.<sup>109</sup> Farmers generally rely heavily on credit to purchase agricultural inputs like seed, fertilizer and herbicides.<sup>110</sup> Higher prices and lower returns can make it more difficult for them to pay down these debts, creating deteriorating credit conditions and threatening the survival of many farmers.<sup>111</sup> According to Roger Johnson, President of the National Farmers Union, an increase in seed prices could cripple U.S. family farms in particular, which are facing a fifth straight year of decreased commodity prices and reduced incomes.<sup>112</sup>



# Higher prices and lower returns can threaten the survival of many farmers.



---

## Conclusion

The merger of Monsanto and Bayer likely would result in the single “globally integrated agricultural platform” of seeds, traits, crop protection biologics and digital farming that Monsanto CEO Hugh Grant foresaw when he approached Bayer about combining the companies.

History demonstrates that further consolidation of these separate industries could substantially increase the price of agricultural inputs. A merger between Monsanto and Bayer, however, would also entail the unprecedented integration of these industries and represent a qualitatively different concentration of markets than any of the previous agricultural sector mega-mergers. Merging the world’s largest seed seller to create a company that is also the world’s largest agrochemical seller would only enhance its ability to raise agricultural input prices and engage in anti-competitive behavior using a variety of strategies Monsanto has employed in the past.

Bayer is attempting to avoid the legitimate antitrust concerns of regulatory agencies by divesting assets most likely to be scrutinized. By selling these assets to BASF, however, the divestiture becomes a mere shell game that very likely strengthens the ability of the merged company to control agricultural input markets, reduce retail choices, raise input prices and rob U.S. farmers of critical income.

# Endnotes

- 1 Tom Philpott, "Monsanto Just Rejected Bayer's Latest Buyout Offer," Mother Jones, July 19, 2016, accessed on November 9, 2017, available at <http://www.motherjones.com/food/2016/06/monsanto-just-cant-quit-pesticides/#>.
- 2 National Farmers Union, et. al., Letter to Senators Grassley, Feinstein, Lee and Klobuchar, May 9, 2017, accessed on November 13, 2017, available at [http://webiva-downton.s3.amazonaws.com/877/db/a/10256/5.09\\_Group\\_Letter\\_Delrahim\\_Confirmation\\_Hearing.pdf](http://webiva-downton.s3.amazonaws.com/877/db/a/10256/5.09_Group_Letter_Delrahim_Confirmation_Hearing.pdf).
- 3 Henry Bryant et. al., "Effects of Proposed Mergers and Acquisitions Among Biotechnology Firms on Seed Prices," Agricultural Food Policy Center, The Texas A&M University System, December 2016, accessed on November 8, 2017, available at [https://www.afpc.tamu.edu/research/publications/files/675/WP\\_16-2.pdf](https://www.afpc.tamu.edu/research/publications/files/675/WP_16-2.pdf); and National Farmers Union, et. al., Letter to Senators Grassley, Feinstein, Lee and Klobuchar, May 9, 2017, accessed on November 13, 2017, available at [http://webiva-downton.s3.amazonaws.com/877/db/a/10256/5.09\\_Group\\_Letter\\_Delrahim\\_Confirmation\\_Hearing.pdf](http://webiva-downton.s3.amazonaws.com/877/db/a/10256/5.09_Group_Letter_Delrahim_Confirmation_Hearing.pdf).
- 4 National Farmers Union, et. al., Letter to Senators Grassley, Feinstein, Lee and Klobuchar, May 9, 2017, accessed on November 13, 2017, available at [http://webiva-downton.s3.amazonaws.com/877/db/a/10256/5.09\\_Group\\_Letter\\_Delrahim\\_Confirmation\\_Hearing.pdf](http://webiva-downton.s3.amazonaws.com/877/db/a/10256/5.09_Group_Letter_Delrahim_Confirmation_Hearing.pdf).
- 5 Maurice E. Stucke and Allen P. Grimes, *An Antitrust Review of a Bayer-Monsanto Merger*, The Konkurrenz Group, July 22, 2016, accessed on November 7, 2017, available at <https://s3-us-west-2.amazonaws.com/sou-assets/Konkurrenz-findings-on-Bayer-Monsanto.pdf>.
- 6 Maurice E. Stucke and Allen P. Grimes, *An Antitrust Review of a Bayer-Monsanto Merger*, The Konkurrenz Group, July 22, 2016, accessed on November 7, 2017, available at <https://s3-us-west-2.amazonaws.com/sou-assets/Konkurrenz-findings-on-Bayer-Monsanto.pdf>.
- 7 Maurice E. Stucke and Allen P. Grimes, *An Antitrust Review of a Bayer-Monsanto Merger*, The Konkurrenz Group, July 22, 2016, accessed on November 7, 2017, available at <https://s3-us-west-2.amazonaws.com/sou-assets/Konkurrenz-findings-on-Bayer-Monsanto.pdf>.
- 8 Maurice E. Stucke and Allen P. Grimes, *An Antitrust Review of a Bayer-Monsanto Merger*, The Konkurrenz Group, July 22, 2016, accessed on November 7, 2017, available at <https://s3-us-west-2.amazonaws.com/sou-assets/Konkurrenz-findings-on-Bayer-Monsanto.pdf>.
- 9 Maurice E. Stucke and Allen P. Grimes, *An Antitrust Review of a Bayer-Monsanto Merger*, The Konkurrenz Group, July 22, 2016, accessed on November 7, 2017, available at <https://s3-us-west-2.amazonaws.com/sou-assets/Konkurrenz-findings-on-Bayer-Monsanto.pdf>.
- 10 Maurice E. Stucke and Allen P. Grimes, *An Antitrust Review of a Bayer-Monsanto Merger*, The Konkurrenz Group, July 22, 2016, accessed on November 7, 2017, available at <https://s3-us-west-2.amazonaws.com/sou-assets/Konkurrenz-findings-on-Bayer-Monsanto.pdf>.
- 11 Maurice E. Stucke and Allen P. Grimes, *An Antitrust Review of a Bayer-Monsanto Merger*, The Konkurrenz Group, July 22, 2016, accessed on November 7, 2017, available at <https://s3-us-west-2.amazonaws.com/sou-assets/Konkurrenz-findings-on-Bayer-Monsanto.pdf>.
- 12 Maurice E. Stucke and Allen P. Grimes, *An Antitrust Review of a Bayer-Monsanto Merger*, The Konkurrenz Group, July 22, 2016, accessed on November 7, 2017, available at <https://s3-us-west-2.amazonaws.com/sou-assets/Konkurrenz-findings-on-Bayer-Monsanto.pdf>.
- 13 Keith O. Fuglie, et. al., Research Investments and Market Structure in the Food Processing, Agricultural Input, and Biofuel Industries Worldwide, U.S. Department of Agriculture, Economic Research Service, Economic Research Report No. 19, December 2011, accessed on November 9, 2017, available at <http://ageconsearch.umn.edu/bitstream/120324/2/err-130.pdf>.
- 14 Keith O. Fuglie, et. al., Research Investments and Market Structure in the Food Processing, Agricultural Input, and Biofuel Industries Worldwide, U.S. Department of Agriculture, Economic Research Service, Economic Research Report No. 19, December 2011, accessed on November 9, 2017, available at <http://ageconsearch.umn.edu/bitstream/120324/2/err-130.pdf>.
- 15 Maurice E. Stucke and Allen P. Grimes, *An Antitrust Review of a Bayer-Monsanto Merger*, The Konkurrenz Group, July 22, 2016, accessed on November 7, 2017, available at <https://s3-us-west-2.amazonaws.com/sou-assets/Konkurrenz-findings-on-Bayer-Monsanto.pdf>.
- 16 The Organic Center, *The Unsettling Story of Seeds*, March, 2011, accessed on November 11, 2017, available at <https://organic-center.org/reportfiles/SeedPrices2-Pager.pdf>.
- 17 The Organic Center, *The Unsettling Story of Seeds*, March, 2011, accessed on November 11, 2017, available at <https://organic-center.org/reportfiles/SeedPrices2-Pager.pdf>.
- 18 The Organic Center, *The Unsettling Story of Seeds*, March, 2011, accessed on November 11, 2017, available at <https://organic-center.org/reportfiles/SeedPrices2-Pager.pdf>.
- 19 The Organic Center, *The Unsettling Story of Seeds*, March, 2011, accessed on November 11, 2017, available at <https://organic-center.org/reportfiles/SeedPrices2-Pager.pdf>.
- 20 The Organic Center, *The Unsettling Story of Seeds*, March, 2011, accessed on November 11, 2017, available at <https://organic-center.org/reportfiles/SeedPrices2-Pager.pdf>.
- 21 The Organic Center, *The Unsettling Story of Seeds*, March, 2011, accessed on November 11, 2017, available at <https://organic-center.org/reportfiles/SeedPrices2-Pager.pdf>.
- 22 U.S. Department of Agriculture, "Recent Trends in GE Adoption," *Adoption of Genetically Engineered Crops in the U.S.*, Economic Research Service, July 12, 2017, accessed November 8, 2017, available at <https://www.ers.usda.gov/data-products/adoption-of-genetically-engineered-crops-in-the-us/recent-trends-in-ge-adoption.aspx>.
- 23 U.S. Department of Agriculture, "Recent Trends in GE Adoption," *Adoption of Genetically Engineered Crops in the U.S.*, Economic Research Service, July 12, 2017, accessed November 8, 2017, available at <https://www.ers.usda.gov/data-products/adoption-of-genetically-engineered-crops-in-the-us/recent-trends-in-ge-adoption.aspx>.
- 24 The Organic Center, *The Unsettling Story of Seeds*, March, 2011, accessed on November 11, 2017, available at <https://organic-center.org/reportfiles/SeedPrices2-Pager.pdf>.
- 25 Leah Douglas, "Monsanto-Bayer mega-deal a nightmare for America?" CNN, May 23, 2016, accessed on November 7, 2017, available at <http://www.cnn.com/2016/05/23/opinions/monsanto-bayer-douglas/>.
- 26 Henry Bryant et. al., "Effects of Proposed Mergers and Acquisitions Among Biotechnology Firms on Seed Prices," Agricultural Food Policy Center, The Texas A&M University System, December 2016, accessed on November 8, 2017, available at [https://www.afpc.tamu.edu/research/publications/files/675/WP\\_16-2.pdf](https://www.afpc.tamu.edu/research/publications/files/675/WP_16-2.pdf).
- 27 Leah Douglas, "Monsanto-Bayer mega-deal a nightmare for America?" CNN, May 23, 2016, accessed on November 7, 2017, available at <http://www.cnn.com/2016/05/23/opinions/monsanto-bayer-douglas/>; and "Top 20 Global Agchem Firms i2015: Majority declining May open up are dominated by 4 giants," Agropages, September 20, 2016, accessed November 6, 2017, available at <http://news.agropages.com/News/NewsDetail---19400.htm>.

- 28 Maurice E. Stucke and Allen P. Grimes, *An Antitrust Review of a Bayer-Monsanto Merger*, The Konkurrenz Group, July 22, 2016, accessed on November 7, 2017, available at <https://s3-us-west-2.amazonaws.com/sou-assets/Konkurrenz-findings-on-Bayer-Monsanto.pdf>.
- 29 Diana L. Moss, "Competition, Intellectual Property Rights, and Transgenic Seeds," *South Dakota Law Review*, v.58, Spring 2013, accessed on November 7, 2017, available at <http://www.antitrustinstitute.org/sites/default/files/58SDLRev543.2013.pdf>.
- 30 Leah Douglas, "Monsanto-Bayer mega-deal a nightmare for America?" CNN, May 23, 2016, accessed on November 7, 2017, available at <http://www.cnn.com/2016/05/23/opinions/monsanto-bayer-douglas/>.
- 31 "Top 20 Global Agchem Firms i2015: Majority declining May open up are dominated by 4 giants," Agropages, September 20, 2016, accessed November 6, 2017, available at <http://news.agropages.com/News/NewsDetail---19400.htm>.
- 32 "Top 20 Global Agchem Firms i2015: Majority declining May open up are dominated by 4 giants," Agropages, September 20, 2016, accessed November 6, 2017, available at <http://news.agropages.com/News/NewsDetail---19400.htm>.
- 33 "Top 20 Global Agchem Firms i2015: Majority declining May open up are dominated by 4 giants," Agropages, September 20, 2016, accessed November 6, 2017, available at <http://news.agropages.com/News/NewsDetail---19400.htm>.
- 34 Henry Bryant et. al., "Effects of Proposed Mergers and Acquisitions Among Biotechnology Firms on Seed Prices," Agricultural Food Policy Center, The Texas A&M University System, December 2016, accessed on November 8, 2017, available at [https://www.afpc.tamu.edu/research/publications/files/675/WP\\_16-2.pdf](https://www.afpc.tamu.edu/research/publications/files/675/WP_16-2.pdf).
- 35 Henry Bryant et. al., "Effects of Proposed Mergers and Acquisitions Among Biotechnology Firms on Seed Prices," Agricultural Food Policy Center, The Texas A&M University System, December 2016, accessed on November 8, 2017, available at [https://www.afpc.tamu.edu/research/publications/files/675/WP\\_16-2.pdf](https://www.afpc.tamu.edu/research/publications/files/675/WP_16-2.pdf).
- 36 Henry Bryant et. al., "Effects of Proposed Mergers and Acquisitions Among Biotechnology Firms on Seed Prices," Agricultural Food Policy Center, The Texas A&M University System, December 2016, accessed on November 8, 2017, available at [https://www.afpc.tamu.edu/research/publications/files/675/WP\\_16-2.pdf](https://www.afpc.tamu.edu/research/publications/files/675/WP_16-2.pdf).
- 37 Henry Bryant et. al., "Effects of Proposed Mergers and Acquisitions Among Biotechnology Firms on Seed Prices," Agricultural Food Policy Center, The Texas A&M University System, December 2016, accessed on November 8, 2017, available at [https://www.afpc.tamu.edu/research/publications/files/675/WP\\_16-2.pdf](https://www.afpc.tamu.edu/research/publications/files/675/WP_16-2.pdf).
- 38 Henry Bryant et. al., "Effects of Proposed Mergers and Acquisitions Among Biotechnology Firms on Seed Prices," Agricultural Food Policy Center, The Texas A&M University System, December 2016, accessed on November 8, 2017, available at [https://www.afpc.tamu.edu/research/publications/files/675/WP\\_16-2.pdf](https://www.afpc.tamu.edu/research/publications/files/675/WP_16-2.pdf).
- 39 U.S. Department of Justice (DOJ), Complaint, *United States of America v. Monsanto Company and Delta and Pine Land Company*, United States District Court for the District of Columbia, Doc. #1:07-cv-00992-RMU, Filed May 31, 2007.
- 40 U.S. Department of Justice (DOJ), "Justice Department Requires Divestitures in \$1.5 Billion Merger of Monsanto and Delta & Pineland," Press Release, May 31, 2007, accessed on November 6, 2017, available at [https://www.justice.gov/archive/atr/public/press\\_releases/2007/223676.htm](https://www.justice.gov/archive/atr/public/press_releases/2007/223676.htm).
- 41 U.S. Department of Justice (DOJ), Complaint, *United States of America v. Monsanto Company and Delta and Pine Land Company*, United States District Court for the District of Columbia, Doc. #1:07-cv-00992-RMU, Filed May 31, 2007.
- 42 U.S. Department of Justice (DOJ), Complaint, *United States of America v. Monsanto Company and Delta and Pine Land Company*, United States District Court for the District of Columbia, Doc. #1:07-cv-00992-RMU, Filed May 31, 2007.
- 43 U.S. Department of Justice (DOJ), Complaint, *United States of America v. Monsanto Company and Delta and Pine Land Company*, United States District Court for the District of Columbia, Doc. #1:07-cv-00992-RMU, Filed May 31, 2007.
- 44 U.S. Department of Justice (DOJ), Complaint, *United States of America v. Monsanto Company and Delta and Pine Land Company*, United States District Court for the District of Columbia, Doc. #1:07-cv-00992-RMU, Filed May 31, 2007.
- 45 U.S. Department of Justice (DOJ), "Justice Department Requires Divestitures in \$1.5 Billion Merger of Monsanto and Delta & Pineland," Press Release, May 31, 2007, accessed on November 6, 2017, available at [https://www.justice.gov/archive/atr/public/press\\_releases/2007/223676.htm](https://www.justice.gov/archive/atr/public/press_releases/2007/223676.htm).
- 46 "Bayer CropScience purchasing Stoneville for \$310 million," Memphis Business Journal, May 31, 2007, accessed on November 7, 2017, available at <https://www.bizjournals.com/memphis/stories/2007/05/28/daily16.html>.
- 47 Maurice E. Stucke and Allen P. Grimes, *An Antitrust Review of a Bayer-Monsanto Merger*, The Konkurrenz Group, July 22, 2016, accessed on November 7, 2017, available at <https://s3-us-west-2.amazonaws.com/sou-assets/Konkurrenz-findings-on-Bayer-Monsanto.pdf>.
- 48 Maurice E. Stucke and Allen P. Grimes, *An Antitrust Review of a Bayer-Monsanto Merger*, The Konkurrenz Group, July 22, 2016, accessed on November 7, 2017, available at <https://s3-us-west-2.amazonaws.com/sou-assets/Konkurrenz-findings-on-Bayer-Monsanto.pdf>.
- 49 Maurice E. Stucke and Allen P. Grimes, *An Antitrust Review of a Bayer-Monsanto Merger*, The Konkurrenz Group, July 22, 2016, accessed on November 7, 2017, available at <https://s3-us-west-2.amazonaws.com/sou-assets/Konkurrenz-findings-on-Bayer-Monsanto.pdf>.
- 50 Maurice E. Stucke and Allen P. Grimes, *An Antitrust Review of a Bayer-Monsanto Merger*, The Konkurrenz Group, July 22, 2016, accessed on November 7, 2017, available at <https://s3-us-west-2.amazonaws.com/sou-assets/Konkurrenz-findings-on-Bayer-Monsanto.pdf>.
- 51 Maurice E. Stucke and Allen P. Grimes, *An Antitrust Review of a Bayer-Monsanto Merger*, The Konkurrenz Group, July 22, 2016, accessed on November 7, 2017, available at <https://s3-us-west-2.amazonaws.com/sou-assets/Konkurrenz-findings-on-Bayer-Monsanto.pdf>.
- 52 Maurice E. Stucke and Allen P. Grimes, *An Antitrust Review of a Bayer-Monsanto Merger*, The Konkurrenz Group, July 22, 2016, accessed on November 7, 2017, available at <https://s3-us-west-2.amazonaws.com/sou-assets/Konkurrenz-findings-on-Bayer-Monsanto.pdf>.
- 53 Maurice E. Stucke and Allen P. Grimes, *An Antitrust Review of a Bayer-Monsanto Merger*, The Konkurrenz Group, July 22, 2016, accessed on November 7, 2017, available at <https://s3-us-west-2.amazonaws.com/sou-assets/Konkurrenz-findings-on-Bayer-Monsanto.pdf>.
- 54 U.S. Department of Justice (DOJ), Complaint, *United States of America v. Monsanto Company and Delta and Pine Land Company*, United States District Court for the District of Columbia, Doc. #1:07-cv-00992-RMU, Filed May 31, 2007.
- 55 Diana L. Moss, "Competition, Intellectual Property Rights, and Transgenic Seeds," *South Dakota Law Review*, v.58, Spring 2013, accessed on November 7, 2017, available at <http://www.antitrustinstitute.org/sites/default/files/58SDLRev543.2013.pdf>.
- 56 Diana L. Moss, "Competition, Intellectual Property Rights, and Transgenic Seeds," *South Dakota Law Review*, v.58, Spring 2013, accessed on November 7, 2017, available at <http://www.antitrustinstitute.org/sites/default/files/58SDLRev543.2013.pdf>.
- 57 Maurice E. Stucke and Allen P. Grimes, *An Antitrust Review of a Bayer-Monsanto Merger*, The Konkurrenz Group, July 22, 2016, accessed on November 7, 2017, available at <https://s3-us-west-2.amazonaws.com/sou-assets/Konkurrenz-findings-on-Bayer-Monsanto.pdf>.

- 58 U.S. Department of Justice (DOJ), Competitive Impact Statement, *United States of America v. Monsanto Company and Delta Pine Land Company*, United States District Court for the District of Columbia, Doc. #1:07-cv-00992, filed on May 31, 2007.
- 59 Maurice E. Stucke and Allen P. Grimes, *An Antitrust Review of a Bayer-Monsanto Merger*, The Konkurrenz Group, July 22, 2016, accessed on November 7, 2017, available at <https://s3-us-west-2.amazonaws.com/sou-assets/Konkurrenz-findings-on-Bayer-Monsanto.pdf>
- 60 Roger Johnson, Testimony Submitted to the U.S. Senate Committee on the Judiciary Regarding Consolidation and Competition in the U.S. Seed and Agrochemical Industry, September 20, 2016, p.6, accessed on November 6, 2017, available at <https://www.judiciary.senate.gov/imo/media/doc/09-20-16%20Johnson%20Testimony.pdf>.
- 61 Ioannis Lianos and Dmitry Katalovsky, "Merger Activity in the Factors of Production Segments of the Food Value Chain: -A Critical Assessment of the Bayer/Monsanto merger," Centre for Law, Economic and Society, Policy Paper Series: 2017/1, October, 2017, accessed on November 11, 2017 available at <https://www.ucl.ac.uk/cles/policy-papers/policy-papers/cles-policy-paper-1-2017>.
- 62 U.S. Department of Justice (DOJ), Complaint, *United States of America v. Monsanto Company and Delta and Pine Land Company*, United States District Court for the District of Columbia, Doc. #1:07-cv-00992-RMU, Filed May 31, 2007.
- 63 Maurice E. Stucke and Allen P. Grimes, *An Antitrust Review of a Bayer-Monsanto Merger*, The Konkurrenz Group, July 22, 2016, accessed on November 7, 2017, available at <https://s3-us-west-2.amazonaws.com/sou-assets/Konkurrenz-findings-on-Bayer-Monsanto.pdf>
- 64 "Monsanto's Climate Corp to Expand Digital Farming Platform," *Fortune*, August 17, 2016, accessed November 9, 2017, available at <http://fortune.com/2016/08/17/monsantos-climate-corp-to-expand-digital-farming-platform/>.
- 65 Louisa Burnwood-Taylor, "What do Monsanto's Plans to Open Up its Digital Platform Mean for the Agriculture Industry?," *Agfunder News*, August 18, 2016, accessed on November 9, 2017, available at <https://agfundernews.com/what-do-monsanto-plans-to-open-up-its-digital-platform-mean-for-the-agriculture-industry.html>.
- 66 James C. Sulecki, "Climate's FieldView Platform Is Poised For Serious Inroads," *PrecisionAg*, July 26, 2016, accessed November 9, 2017, available at <http://www.precisionag.com/systems-management/climates-fieldview-platform-is-poised-for-serious-inroads/2/>.
- 67 James C. Sulecki, "Climate's FieldView Platform Is Poised For Serious Inroads," *PrecisionAg*, July 26, 2016, accessed November 9, 2017, available at <http://www.precisionag.com/systems-management/climates-fieldview-platform-is-poised-for-serious-inroads/2/>.
- 68 Maurice E. Stucke and Allen P. Grimes, *An Antitrust Review of a Bayer-Monsanto Merger*, The Konkurrenz Group, July 22, 2016, accessed on November 7, 2017, available at <https://s3-us-west-2.amazonaws.com/sou-assets/Konkurrenz-findings-on-Bayer-Monsanto.pdf>
- 69 Russell Kennedy, "Will mega-mergers modify Agricultural industry's DNA?," *Lexology*, September 18, 2017, accessed November 14, 2017, available at <https://www.lexology.com/library/detail.aspx?g=d18c6f10-83c8-4683-9718-8f17ce4e96c6>.
- 70 Russell Kennedy, "Will mega-mergers modify Agricultural industry's DNA?," *Lexology*, September 18, 2017, accessed November 14, 2017, available at <https://www.lexology.com/library/detail.aspx?g=d18c6f10-83c8-4683-9718-8f17ce4e96c6>.
- 71 Maurice E. Stucke and Allen P. Grimes, *An Antitrust Review of a Bayer-Monsanto Merger*, The Konkurrenz Group, July 22, 2016, accessed on November 7, 2017, available at <https://s3-us-west-2.amazonaws.com/sou-assets/Konkurrenz-findings-on-Bayer-Monsanto.pdf>.
- 72 Pat Mooney, et. al., Too Big To Feed, IPES-Food Report, October 2017, accessed November 14, 2017, available at [http://www.ipes-food.org/images/Reports/Concentration\\_FullReport.pdf](http://www.ipes-food.org/images/Reports/Concentration_FullReport.pdf).
- 73 Maurice E. Stucke and Allen P. Grimes, *An Antitrust Review of a Bayer-Monsanto Merger*, The Konkurrenz Group, July 22, 2016, accessed on November 7, 2017, available at <https://s3-us-west-2.amazonaws.com/sou-assets/Konkurrenz-findings-on-Bayer-Monsanto.pdf>.
- 74 Philippa Mathews, "BASF to cut 350 jobs in plant science research," *Chemistry World*, February 26, 2016, accessed November 13, 2017, available at <https://www.chemistryworld.com/news/basf-to-cut-350-jobs-in-plant-science-research/9517.article>.
- 75 Tracy Staton, "Bayer's hefty 2016 pharma growth underlines danger of neglecting R&D for Monsanto buy," *FiercePharma*, February 22, 2017, accessed November 14, 2017, available at <http://www.fiercepharma.com/pharma/bayer-s-hefty-2016-pharma-growth-underlines-danger-neglecting-r-d-for-monsanto-buy>.
- 76 Maurice E. Stucke and Allen P. Grimes, *An Antitrust Review of a Bayer-Monsanto Merger*, The Konkurrenz Group, July 22, 2016, accessed on November 7, 2017, available at <https://s3-us-west-2.amazonaws.com/sou-assets/Konkurrenz-findings-on-Bayer-Monsanto.pdf>.
- 77 Pat Mooney, et. al., Too Big To Feed, IPES-Food Report, October 2017, accessed November 14, 2017, available at [http://www.ipes-food.org/images/Reports/Concentration\\_FullReport.pdf](http://www.ipes-food.org/images/Reports/Concentration_FullReport.pdf).
- 78 Pat Mooney, et. al., Too Big To Feed, IPES-Food Report, October 2017, accessed November 14, 2017, available at [http://www.ipes-food.org/images/Reports/Concentration\\_FullReport.pdf](http://www.ipes-food.org/images/Reports/Concentration_FullReport.pdf).
- 79 Pat Mooney, et. al., Too Big To Feed, IPES-Food Report, October 2017, accessed November 14, 2017, available at [http://www.ipes-food.org/images/Reports/Concentration\\_FullReport.pdf](http://www.ipes-food.org/images/Reports/Concentration_FullReport.pdf).
- 80 Antonio Regalado, "As Patents Expire, Farmers Plant Generic GMOs," *MIT Technology Review*, July 30, 2015, accessed November 14, 2017, available at <https://www.technologyreview.com/s/539746/as-patents-expire-farmers-plant-generic-gmos/>.
- 81 Maurice E. Stucke and Allen P. Grimes, *An Antitrust Review of a Bayer-Monsanto Merger*, The Konkurrenz Group, July 22, 2016, accessed on November 7, 2017, available at <https://s3-us-west-2.amazonaws.com/sou-assets/Konkurrenz-findings-on-Bayer-Monsanto.pdf>.
- 82 Pat Mooney, et. al., Too Big To Feed, IPES-Food Report, October 2017, accessed November 14, 2017, available at [http://www.ipes-food.org/images/Reports/Concentration\\_FullReport.pdf](http://www.ipes-food.org/images/Reports/Concentration_FullReport.pdf).
- 83 Pat Mooney, et. al., Too Big To Feed, IPES-Food Report, October 2017, accessed November 14, 2017, available at [http://www.ipes-food.org/images/Reports/Concentration\\_FullReport.pdf](http://www.ipes-food.org/images/Reports/Concentration_FullReport.pdf).
- 84 Bartholomew D. Sullivan, "Mega-mergers in agribusiness raise concerns about food costs, biodiversity," *USA Today*, August 29, 2017, accessed November 14, 2017, available at <https://www.usatoday.com/story/news/politics/2017/08/29/mega-mergers-agribusiness-raise-concerns-food-costs-biodiversity/558980001/>.
- 85 Tom Philpott, "Monsanto Just Rejected Bayer's Latest Buyout Offer," *Mother Jones*, July 19, 2016, accessed on November 9, 2017, available at <http://www.motherjones.com/food/2016/06/monsanto-just-cant-quit-pesticides/#>.
- 86 Leah Douglas, "Monsanto-Bayer mega-deal a nightmare for America?" *CNN*, May 23, 2016, accessed on November 7, 2017, available at <http://www.cnn.com/2016/05/23/opinions/monsanto-bayer-douglas/>.

- 87 Robert Holly, "Cotton industry looms large in Bayer-Monsanto deal," BigAgWatch, October 26, 2016, accessed on November 9, 2017, available at <http://big-agwatch.org/2016/10/27/cotton-industry-looks-large-in-bayer-monsanto-deal/>.
- 88 Bayer, "Bayer signs agreement to sell selected Crop Science businesses to BASF for EUR 5.9 billion, October 13, 2017, accessed November 9, 2017, available at <http://www.press.bayer.com/baynews/baynews.nsf/id/Bayer-signs-agreement-to-sell-selected-Crop-Science-businesses-to-BASF-for-EUR-59-billion>.
- 89 Lisa Heacox, "Seed Firms Changes Bring Uncertainty, Promises," CropLife, November 13, 2017, accessed November 13, 2017, available at <http://www.croplife.com/crop-inputs/seed-firms-changes-bring-uncertainty-promises/>.
- 90 Lisa Heacox, "Seed Firms Changes Bring Uncertainty, Promises," CropLife, November 13, 2017, accessed November 13, 2017, available at <http://www.croplife.com/crop-inputs/seed-firms-changes-bring-uncertainty-promises/>.
- 91 Ludwig Burger, "Monsanto and BASF may reap more from partnership after Syngenta sale," Reuters, February 5, 2016, accessed November 13, 2017, available at <https://www.reuters.com/article/us-monsanto-basf-collaboration/m Monsanto-and-basf-may-reap-more-from-partnership-after-syngenta-sale-idUSKCN0VE1CR>.
- 92 "BASF Plant Science and Monsanto to expand their collaboration in maximizing crop yield," Bionity.com, July 9, 2010, accessed November 13, 2017, available at <http://www.bionity.com/en/news/119826/basf-plant-science-and-monsanto-to-expand-their-collaboration-in-maximizing-crop-yield.html>.
- 93 "BASF Plant Science and Monsanto to expand their collaboration in maximizing crop yield," Bionity.com, July 9, 2010, accessed November 13, 2017, available at <http://www.bionity.com/en/news/119826/basf-plant-science-and-monsanto-to-expand-their-collaboration-in-maximizing-crop-yield.html>.
- 94 "BASF Plant Science and Monsanto to expand their collaboration in maximizing crop yield," Bionity.com, July 9, 2010, accessed November 13, 2017, available at <http://www.bionity.com/en/news/119826/basf-plant-science-and-monsanto-to-expand-their-collaboration-in-maximizing-crop-yield.html>.
- 95 "BASF Plant Science and Monsanto to expand their collaboration in maximizing crop yield," Bionity.com, July 9, 2010, accessed November 13, 2017, available at <http://www.bionity.com/en/news/119826/basf-plant-science-and-monsanto-to-expand-their-collaboration-in-maximizing-crop-yield.html>.
- 96 "Monsanto, BASF announce progress in annual collaboration pipeline update," AgroNews, January 9, 2015, accessed November 13, 2017, available at <http://news.agropages.com/News/NewsDetail---13926.htm>.
- 97 "BASF and Monsanto Take Dicamba Tolerant Cropping System Collaboration to the Next Level," PRNewswire, March 14, 2011, accessed November 13, 2017, available at <https://www.prnewswire.com/news-releases/basf-and-monsanto-take-dicamba-tolerant-cropping-system-collaboration-to-the-next-level-117927054.html>.
- 98 Canadian Biotechnology Action Network (CBAN), "2,4-D and Dicamba-Tolerant Crops," Take Action, 2017, accessed November 14, 2017, available at <https://cban.ca/gmos/issues/pesticides/24-d-and-dicamba-tolerant-crops/>.
- 99 "BASF and Monsanto Take Dicamba Tolerant Cropping System Collaboration to the Next Level," PRNewswire, March 14, 2011, accessed November 13, 2017, available at <https://www.prnewswire.com/news-releases/basf-and-monsanto-take-dicamba-tolerant-cropping-system-collaboration-to-the-next-level-117927054.html>.
- 100 Matthew J. Grassi, "Monsanto's Highly Anticipated XtendiMax Dicamba Herbicide Approved for Over-The-Top in 2017," CropLife, November 10, 2016, accessed November 14, 2017, available at <http://www.croplife.com/crop-inputs/monsantos-highly-anticipated-xtendimax-dicamba-formulation-approved-for-over-the-top-in-2017/>.
- 101 Pam Smith, "Bayer Willing to Sell Assets," The Progressive Farmer, May 9, 2017, accessed November 14, 2017, available at <https://www.dtnpf.com/agriculture/web/ag/news/crops/article/2017/05/09/liberty-trait-herbicide-block-3>.
- 102 U.S. Department of Justice (DOJ), Complaint, United States of America v. Monsanto Company and Delta and Pine Land Company, United States District Court for the District of Columbia, Doc. #1:07-cv-00992-RMU, Filed May 31, 2007.
- 103 U.S. Department of Justice (DOJ), Complaint, United States of America v. Monsanto Company and Delta and Pine Land Company, United States District Court for the District of Columbia, Doc. #1:07-cv-00992-RMU, Filed May 31, 2007.
- 104 Philippa Mathews, "BASF to cut 350 jobs in plant science research," Chemistry World, February 26, 2016, accessed November 13, 2017, available at <https://www.chemistryworld.com/news/basf-to-cut-350-jobs-in-plant-science-research/9517.article>.
- 105 Maurice E. Stucke and Allen P. Grimes, An Antitrust Review of a Bayer-Monsanto Merger, The Konkurrenz Group, July 22, 2016, accessed on November 7, 2017, available at <https://s3-us-west-2.amazonaws.com/sou-assets/Konkurrenz-findings-on-Bayer-Monsanto.pdf>.
- 106 Alicia Harvie, "A Looming Crisis on American Farms," Farm Aid Fact Sheets, April 13, 2017, accessed on November 14, 2017, available at <https://www.farmaid.org/blog/fact-sheet/looming-crisis-american-farms/>.
- 107 Maurice E. Stucke and Allen P. Grimes, An Antitrust Review of a Bayer-Monsanto Merger, The Konkurrenz Group, July 22, 2016, accessed on November 7, 2017, available at <https://s3-us-west-2.amazonaws.com/sou-assets/Konkurrenz-findings-on-Bayer-Monsanto.pdf>.
- 108 Alex Whiting, "Mega-mergers will squeeze farmers, push up food prices, experts warn," Reuters, October 13, 2017, accessed November 14, 2017, available at <https://www.reuters.com/article/us-food-m-a/mega-mergers-will-squeeze-farmers-push-up-food-prices-experts-warn-idUSKBN1C1X9>.
- 109 Alex Black, "US Farmers unsettled by prospect of Bayer-Monsanto merger," Farmers Guardian, June 7, 2016, accessed November 8, 2017, available at <https://www.fginsight.com/news/news/us-farmers-unsettled-by-prospect-of-bayer-monsanto-merger-12679>.
- 110 Alicia Harvie, "A Looming Crisis on American Farms," Farm Aid Fact Sheets, April 13, 2017, accessed on November 14, 2017, available at <https://www.farmaid.org/blog/fact-sheet/looming-crisis-american-farms/>.
- 111 Alicia Harvie, "A Looming Crisis on American Farms," Farm Aid Fact Sheets, April 13, 2017, accessed on November 14, 2017, available at <https://www.farmaid.org/blog/fact-sheet/looming-crisis-american-farms/>.
- 112 Alex Black, "US Farmers unsettled by prospect of Bayer-Monsanto merger," Farmers Guardian, June 7, 2016, accessed November 8, 2017, available at <https://www.fginsight.com/news/news/us-farmers-unsettled-by-prospect-of-bayer-monsanto-merger-12679>.

 FARMERS AND FAMILIES FIRST 