

An Updated Antitrust Review of the Bayer-Monsanto Merger

Maurice E. Stucke and Allen P. Grunes*

Introduction

Decades of consolidation in the seed, trait, and pesticide¹ business have not significantly benefitted farmers with lower prices, greater variety, seed trait diversity, or more choices. A recent survey shows why. A coalition of farm groups² conducted in 2018 a survey of nearly 1000 farmers across America.³ The farmers grew a variety of crops, including organic and conventional vegetables⁴ and field crops (corn for grain or seed, soybeans, and wheat).⁵

The farmers, as the survey reflects, are justifiably concerned about weak competition in the seed, trait, and pesticide industries. The farmers' concerns, as this report shows,

* The authors are co-founders of The Konkurrenz Group and are former attorneys with the U.S. Department of Justice, Antitrust Division. The authors would like to thank Victoria Bassetti and Peter Carstensen for their helpful suggestions. Friends of the Earth and SumOfUs provided financial support for the report. The views expressed herein are the authors' own.

¹ We will use the term *pesticides* to refer to herbicides, insecticides, and fungicides used in farming.

² The following groups circulated the instrument to their members or networks: Agricultural Justice Project, California Farmers Guild, Center for Rural Affairs, City Seed, Community Alliance with Family Farmers, Domestic Fair Trade Association, Farmworker Association of Florida, Family Farm Defenders, Farm Aid, Farm and Ranch Freedom Alliance, Farmworker Association of Florida, Florida Organic Growers, Friends of Family Farmers, Hawai'i Farmers Union United, Hawai'i Tropical Fruit Growers, Iowa Farmers Union, International Federation of Organic Agriculture Movements, Kansas Rural Center, Maine Organic Farmers and Gardeners Association, Minnesota Farmers Union, Missouri Coalition for the Environment, National Family Farm Coalition, National Farmers Union, National Latino Farmers and Ranchers Trade Association, Natural Born Tillers, New Britain ROOTS, Northeast Organic Dairy Producers Alliance, Northeast Organic Farming Association of Connecticut, Northeast Organic Farming Association of Massachusetts, Organic Farmers Association, Organic Farming Research Foundation, Organic Seed Alliance, Organic Seed Growers and Trade Association, Organization for Competitive Markets, Our Family Farms, Pesticide Action Network North America, Practical Farmers of Iowa, Ranchers-Cattlemen Action Legal Fund, United Stockgrowers of America, Rural Coalition, Rural Vermont, Sustainable Food Center, Texas Organic Farmers and Gardeners Association, The Cornucopia Institute, Vilicus Farms, and the Women Food and Agriculture Network.

³ There were 957 responses from farmers in 48 states. The surveyed farmers operated a total of 1.96 million acres. The average was 2,051 acres, and median was 80 acres. There were no respondents from Delaware, the District of Columbia, and Rhode Island. 70.6 percent of all respondents work the majority of their time on a farming operation.

⁴ Of those surveyed, 52.5 percent were exclusively vegetable farmers (30 percent conventional and 23 percent organic vegetable).

⁵ Twenty-three percent were exclusively field seed crop farmers (18 percent conventional and 5 percent organic).

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complements the other scholarship, reports, and evidence. Their concerns illustrate why the United States should stop Bayer AG's acquisition of Monsanto Co.

Few, if any, would disagree that the Bayer-Monsanto merger, announced in September 2016, violates U.S. and E.U. competition laws. As the European Commission noted, "the merged entity would hold both the largest portfolio of pesticide products and the strongest global market positions in seeds and traits, making it the largest integrated company in the industry."⁶

As a result, the merging parties have resorted to a familiar practice in the antitrust world: seek to further consolidate the industry on the condition that the merging parties divest assets to a third party. Here to get its acquisition approved, Bayer has offered to divest a portfolio of assets to another remaining Big Five rival, namely BASF. Although the exact scope of Bayer's proposed divestitures is not public, it likely will encompass structural remedies, including Bayer's Liberty and LibertyLink herbicides and traits, and Bayer's canola, oilseed rape, cotton, soybean, and vegetable seeds business.⁷ Given the extensive vertical and horizontal relationships in the highly concentrated trait, seed, data, and chemicals industries, any proposed remedy would also likely include extensive behavioral remedies. This would likely include requiring Bayer to license certain patented traits after the acquisition. Moreover, any consent decree would likely include the right to access Bayer/Monsanto's digital farming data.

⁶ European Commission, Press Release, *Mergers: Commission Opens In-Depth Investigation Into Proposed Acquisition of Monsanto by Bayer*, Aug. 22, 2017, http://europa.eu/rapid/press-release_IP-17-2762_en.htm [hereinafter EC Press Release].

⁷ The divested assets would likely include "Bayer's global glufosinate-ammonium non-selective herbicide business, commercialized under the Liberty®, Basta® and Finale® brands, as well as its seed businesses for key row crops in select markets: canola hybrids in North America under the InVigor® brand using the LibertyLink® trait technology, oilseed rape mainly in European markets, cotton in the Americas and Europe as well as soybean in the Americas. The transaction also includes Bayer's trait research and breeding capabilities for these crops and the LibertyLink® trait and trademark." BASF, Press Release, Business & Financial News, *BASF Signs Agreement to Acquire Significant Parts of Bayer's Seed and Non-Selective Herbicide Businesses* (Oct. 13, 2017), <https://www.basf.com/en/company/news-and-media/news-releases/2017/10/p-17-336.html>; see also *EU says Bayer Monsanto Must Not Hurt Competition in Digital Farming: Paper*, REUTERS, Feb. 10, 2018, <https://www.reuters.com/article/us-monsanto-m-a-bayer-eu/eu-says-bayer-monsanto-must-not-hurt-competition-in-digital-farming-paper-idUSKBN1FU0IJ>.

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Thus, the outstanding issue today is whether the U.S. Department of Justice's Antitrust Division should accept Bayer's proposed divestiture and behavioral remedies. Should the DOJ allow further concentration in already concentrated industries, while trying to restore competition through complex behavioral and structural remedies? To answer this question, we should first ask farmers.

As Part II explores, the overwhelming majority of surveyed farmers are concerned about Bayer's acquisition of Monsanto and that the merger will harm independent farmers and farming communities. The farmers are concerned that a combined Bayer/Monsanto will control their data about farm practices and use its dominance in one product to push sales of other products. They are concerned that the merger will result in higher seed prices, less innovation in seeds and chemicals, and fewer seed varieties. Should the merger gain approval, they are apprehensive of the increasing pressure for chemically dependent farming. As the survey and other evidence show, farmers have not benefitted from prior mergers, which have concentrated the seed, trait, and pesticide business in the hands of five firms. Farmers today are squeezed by higher seed prices. The higher prices for new seed varieties have *not* been offset by increased productivity. Moreover, many of the surveyed farmers have observed less variety and seed diversity as the industry became more concentrated.

Part III discusses why the United States should block Bayer's acquisition of Monsanto. The evidence, including the farmers' concerns, all suggest that the merger will likely lead to higher prices, less variety, and less innovation. Behavioral and structural remedies will not completely cure these anticompetitive harms. The farmers' concerns illustrate the larger problem of the "antitrust light" policies employed over the past 35 years. The evidence strongly suggests that light-touch antitrust has not worked in the trait, seed, and pesticide markets. As the survey and other evidence evince, the increasing concentration has harmed farmers. Nor has light-touch antitrust protected farmers from the increasing concentration along the supply chain.

The farmers' concerns expose a fundamental need to enforce the Clayton Act as it was intended, namely to interdict anticompetitive problems in their incipiency. The farmers' concerns show why there comes a point when the industry becomes so concentrated, that a simple and clean remedy is in order: Just say no.

I. Increasing Concentration in the Industry: From the Big Six to Possibly the Big Four

Since the 1990s, the seed, trait, and pesticide business has become increasingly concentrated in the hands of six firms: Monsanto, Bayer, BASF, Syngenta, Dow, and DuPont. The Big Six's growth primarily came from mergers.⁸ They acquired many small to medium-size enterprises engaged in biotechnology research. The majority of the exits from the industry were the result of acquisition by the Big Six firms.⁹

In 2017, the Big Six became the Big Five with DuPont and Dow Chemical's \$130 billion merger. The merging parties were required to divest a portion of DuPont's crop protection business to FMC Corp., which manufactures primarily herbicides and insecticides.¹⁰ ChemChina acquired Syngenta in a \$44 billion deal.

Now, Bayer is set to acquire Monsanto, which would reduce the Big Five to Big Four. Bayer's proposed acquisition, the European Commission noted, "would create the world's largest integrated pesticides and seeds company. It would combine two competitors with leading portfolios in non-selective herbicides, seeds, and traits, and digital agriculture."¹¹ According to the European Commission's preliminary investigation, Monsanto and Bayer are "two of a limited number of competitors" in the pesticide fields, "capable of discovering new active ingredients and developing

⁸ U.S. Dep't of Agriculture, Econ. Res. Serv., *Mergers and Acquisitions Rose in the Past Three Decades, in THE SEED INDUSTRY IN U.S. AGRICULTURE*, http://www.ers.usda.gov/media/260683/aib786h_1_.pdf; Sylvie Bonny, *Corporate Concentration and Technological Change in the Global Seed Industry*, SUSTAINABILITY 2017, 9, 1632; doi:10.3390/su9091632 www.mdpi.com/journal/sustainability; iPES Food, *Too Big to Feed* 21-24 (Oct. 2017), <http://www.ipes-food.org/new-report-too-big-to-feed-us-expert-panel-sounds-the-alarm-on-mega-mergers-and-calls-for-urgent-review> [hereinafter iPES Food Report].

⁹ Maurice E. Stucke & Allen P. Grunes, *The Konkurrenz Group, An Antitrust Review of a Bayer-Monsanto Merger* (July 22, 2016), <https://www.sumofus.org/media/antitrust-experts-warn-against-proposed-bayer-monsanto-merger/>.

¹⁰ DuPont divested, *inter alia*, its Cereal Broadleaf Herbicides, Chewing Insecticide portfolios, and Crop Protection research and development pipeline and organization, excluding seed treatment, nematocides and late-stage R&D programs and excluding personnel needed to support marketed products and R&D programs that will remain with DuPont. Following the divestiture, DowDuPont's Agriculture division "will retain strong crop protection assets, including an excellent portfolio in corn and soy broadleaf and grass control, a robust cereal weed control portfolio, DuPont's strong position in disease control, and Dow AgroSciences' industry leading insecticide portfolio." DuPont, Press Release, *DuPont Announces Agreement with FMC* (March 31, 2017), <http://www.dupont.com/corporate-functions/media-center/press-releases/dupont-announces-agreement-with-fmc.html>.

¹¹ EC Press Release, *supra* note 6.

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new formulations, including addressing the growing problem of weed resistance to existing products.”¹²

To get its acquisition through the antitrust review process, Bayer announced last October its proposed divestiture to BASF.¹³

II. Farmers Remain Concerned About the Bayer/Monsanto Merger

One driving force for its acquisition, according to Bayer, is its benefits to farmers. They will benefit “from a broad set of solutions to meet their current and future needs, including enhanced solutions in seeds and traits, digital agriculture, and crop protection.”¹⁴

First, do farmers support the merger? Do they see the benefits? Second, have farmers seen the benefits from the past mergers, where the Big Five acquired rivals (subject to some divestitures and behavioral remedies)? The answer is a resounding no.

The overwhelming majority of surveyed farmers are concerned about Bayer’s acquisition of Monsanto (83 percent are very concerned, 11 percent somewhat concerned). Ninety-four percent are concerned that the merger will harm independent farmers and farming communities (84 percent are very concerned, 10 percent somewhat concerned).

The farmers’ top three concerns of the merger are:

- Bayer/Monsanto will use its dominance in one product to push sales of other products (80 percent very concerned/12 percent somewhat concerned);
- Bayer/Monsanto will control data about farm practices (79.5 percent very concerned/12 percent somewhat concerned); and
- The merger will result in increased pressure for chemically dependent farming (77 percent very concerned/12 percent somewhat concerned).

¹² *Id.*

¹³ Chad Bray, *BASF to Buy Bayer Units for \$7 Billion*, N.Y. TIMES, Oct. 13, 2017, <https://www.nytimes.com/2017/10/13/business/dealbook/bayer-basf-monsanto.html>.

¹⁴ Bayer, Press Release, *Bayer and Monsanto to Create a Global Leader in Agriculture* (Sept. 14, 2016), <http://www.press.bayer.com/baynews/baynews.nsf/id/ADSF8F-Bayer-and-Monsanto-to-Create-a-Global-Leader-in-Agriculture>.

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Other concerns were paying more for seed (59 percent very concerned/20 percent somewhat concerned). The conventional field crop farmers, for example, were especially concerned about paying more for seed (72 percent very concerned/20 percent somewhat concerned). Farmers overall were concerned about decreasing innovation in seeds and chemicals post-merger (59 very concerned/21 percent somewhat concerned). They were also concerned that fewer seed varieties will be produced and/or commercially available (70 percent very concerned/19 percent somewhat concerned).

A. Farmers Have Not Significantly Benefitted from the Growing Concentration through Mergers

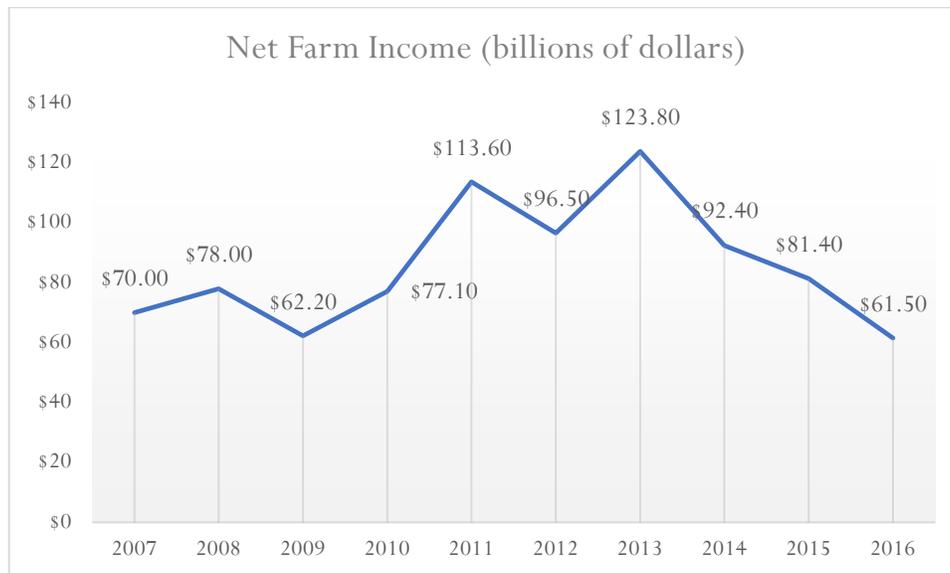
One response might be that the surveyed farmers are simply misinformed, biased, or wrong. Yet, this is not the first time that farmers heard these promises. As we previously discussed, the seed, trait, and pesticide industries became heavily concentrated, primarily through mergers.¹⁵ The promise for allowing this increasing concentration and collaboration among the Big Five was that farmers would ultimately benefit with more innovation, greater variety, more choices, lower prices, and better quality. But as the survey and other evidence show, farmers have not benefitted.

i. The Increasing Concentration Has Increased Seed Prices and Reduced Farmers' Negotiation Power

Farmers today are squeezed by higher costs, including higher seed prices. U.S. farmers are making less. As Chart 1 reflects, overall net farm income (even without adjusting for inflation) is below 2007 levels.

¹⁵ Stucke & Grunes, *supra* note 9.

Chart 1



Source: U.S. Department of Agriculture: Table 9-1.—Economic trends: Data relating to agriculture, United States, 2007–2016

As the *Wall Street Journal* recently reported, this reduction in earnings has forced most farmers to take on second jobs.¹⁶ On average, “82% of U.S. farm household income is expected to come from off-farm work this year, up from 53% in 1960.”¹⁷

Farmers’ gross income is increasing. But they are earning less because their expenses are increasing even more. One contributing factor was rising seed prices as the industry consolidated.¹⁸ According to the U.S. Department of Agriculture (USDA), prices for seed have increased far more than for other agricultural inputs. The USDA compared the prices paid by farmers in the United States for five categories of agricultural inputs. The largest increase during 1994-2010 was in crop seed prices, which more than doubled relative to the price received for agricultural commodities

¹⁶ Jacob Bunge & Jesse Newman, *To Stay on the Land, American Farmers Add Extra Jobs: A drop in agricultural income means side work in rural manufacturing and businesses takes on greater importance in funding food production*, WALL ST. J., Feb. 25, 2018, <https://www.wsj.com/articles/to-stay-on-the-land-american-farmers-add-extra-jobs-1519582071>.

¹⁷ *Id.* (citing U.S. Department of Agriculture figures).

¹⁸ Henry Bryant et al., *Effects of Proposed Mergers and Acquisitions Among Biotechnology Firms on Seed Prices*, Texas A&M University Agricultural & Food Policy Center, Working Paper 16-2 (Sept. 2016), https://www.afpc.tamu.edu/pubs/0/675/WP_16-2.pdf; Keith Fuglie et al., *Rising Concentration in Agricultural Input Industries Influences New Farm Technologies*, USDA Economic Research Service (Dec. 3, 2012), <http://www.ers.usda.gov/amber-waves/2012-december/rising-concentration-in-agricultural-input-industries-influences-new-technologies.aspx>.

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sold by farmers.¹⁹ Seed's share of a farmer's costs had almost doubled over 20 years, from 2.6 percent in 1988 to 4.9 percent in 2008.²⁰ Thus, the prices U.S. farmers have paid for their inputs generally rose faster than the prices they received for their crops.

Much of the price increase in seed is attributable to increasing fees for the genetic traits. Between 32 and 74 percent of the price of seed for corn, soybeans, cotton, and sugar beets in the United States and the European Union were estimated to reflect technology fees or the cost of seed treatments.²¹

Moreover, farmers cannot reuse traited seed. The Big Five, in selling patented traited seeds or licensing their traits, typically allow farmers to plant the seeds for only one crop season.²² For example, Monsanto sells, and allows other companies to sell, Roundup Ready soybean seeds to growers who assent to a special licensing agreement. The grower is permitted to plant the purchased seeds in one (and only one) season.²³ Monsanto obligates the farmer not to save any of the harvested soybeans for replanting, or supply them to anyone else for that purpose.²⁴ Thus, the farmer must purchase seed from Monsanto (or another seed producer) the following season, and bear the brunt of even higher seed prices.²⁵

Farmers in the 2018 survey note how they are being squeezed: 80 percent say they have been steadily paying higher prices over the past five years; 65 percent agree that they have less bargaining power for seeds and chemicals.

One rejoinder is that while paying higher prices for seed, farmers, given the seed's traits and tolerance of specific herbicides, are getting larger yields. But the higher prices for new seed varieties have *not* been offset by increased productivity, according to 64 percent of the surveyed farmers. The problem is felt most acutely by field crop

¹⁹ Keith O. Fuglie et al., *Research Investments and Market Structure in the Food Processing, Agricultural Input, and Biofuel Industries Worldwide*, ERR-130, U.S. Dep't of Agriculture, Econ. Res. Serv. (Dec. 2011), at 11, 13.

²⁰ Letter dated December 31, 2009 from Food & Water Watch to Attorney General Eric Holder and USDA Secretary Tom Vilsack re: Agriculture and Antitrust Enforcement Issues in Our 21st Century Economy at 16 [hereinafter Food & Water Watch Letter].

²¹ Fuglie et al., *supra* note 18, at 13.

²² Food & Water Watch Letter, *supra* note 20, at 16.

²³ *Bowman v. Monsanto Co.*, 569 U.S. 278, 281 (2013).

²⁴ *Id.*

²⁵ Food & Water Watch Letter, *supra* note 20, at 16.

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farmers: 76 percent agree that productivity has not offset the increased price for their seed. So, it is unclear to what extent rising transgenic seed prices have led to sufficient corresponding benefits to farmers. Similarly, the empirical evidence regarding the effect of herbicide-tolerant soybean, corn, and cotton seeds on crop yields is mixed.²⁶ As Roger Johnson, president of the National Farmers Union, a Washington-based group for farmers and ranchers, noted: “Seed costs are the highest input expense for farmers. While some of the cost can be attributed to more sophisticated technology, we have seen time and again that consolidation and market restructuring has increased the cost of crop inputs. In a lagging farm economy with multi-year trends of low commodity prices, additional cost increases for crop inputs could cripple a lot of family farms in this country.”²⁷

Moreover, the farmer survey, consistent with economic theory, shows how farmers can be locked-in. One 2016 economics paper examined why soybean farmers that “recently used patented seed cannot immediately transition if there are seemingly better profit opportunities with the other types.”²⁸ Suppose a soybean farmer could profit that year by switching to either conventional or organic soybean crops. One obstacle is restrictive intellectual property covenants, which require a one-year delay when switching from patented to conventional soybeans.²⁹ Farmers wanting to switch from patented seed to organic crops have another obstacle. They must wait at

²⁶ See, e.g., Jorge Fernandez-Cornejo et al., *Genetically Engineered Crops in the United States*, ERR-162 U.S. Dep’t of Agriculture, Economic Research Service, Feb. 2014, at 16 (“Several researchers found no significant difference between the yields of adopters and nonadopters of HT [herbicide-tolerant seeds]; some found that HT adopters had higher yields, while others found that adopters had lower yields.”). Likewise, the evidence on the impact of herbicide-tolerant seeds (for corn, cotton, and soybeans) on the farmers’ net returns was “mixed”: “Overall, the empirical evidence on the impact of adopting herbicide-tolerant soybeans on net returns is inconclusive.” *Id.* at 22; see also NATIONAL ACADEMIES OF SCIENCES, *GENETICALLY ENGINEERED CROPS: EXPERIENCES AND PROSPECTS*, 7, 66, 99 (2016) (“The nation-wide data on maize, cotton, or soybean in the United States do not show a significant signature of genetic-engineering technology on the rate of yield increase. This does not mean that such increases will not be realized in the future or that current GE traits are not beneficial to farmers.”).

²⁷ Alex Black, *US Farmers Unsettled by Prospect of Bayer-Monsanto Merger*, FG INSIGHT, June 7, 2016; see also National Farmers Union, Press Release, *NFU Stands Firm Against Further Market Consolidation in Opposition to Latest Bayer/Monsanto Merger Proposal*, July 14, 2016, <http://nfu.org/nfu-stands-firm-against-further-market-consolidation-in-opposition-to-latest-bayermonsanto-merger-proposal/5084>.

²⁸ Robert A. Jenson & Christopher Richard McIntosh, *Modeling US Farmer Soybean Seed Choice with Path Dependencies: Inevitable Patented Seed Market Dominance?*, 14 JOURNAL OF AGRICULTURAL & FOOD INDUSTRIAL ORGANIZATION 69, 70 (2016).

²⁹ *Id.* at 71.

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least 36 months for their cropland to comply.³⁰ Network externalities pose a third obstacle: “using patented seed creates a network externality on neighboring farms by increasing their probability of cross-pollination.”³¹ As more neighboring farms, for example, use seed with Monsanto-patented traits, the greater the risk that a neighbor’s crops will cross-pollinate with the farmer’s crop, which increases the probability of Monsanto suing the farmer for not paying royalties. A fourth obstacle is pesticide drift, which can kill the farmer’s crop (if its seed lacks the herbicide-tolerant trait). Thus, these path dependencies make it harder for a farmer to shift to conventional or organic seed, and can push farmers to use the same traited seed as their neighbors.

Indeed, the survey reflected the organic farmers’ concerns about drift:

- 90 percent of organic farmers said they were concerned that agrochemical (e.g., pesticides or herbicides) drift will impact their certification or ability to continue organic farming (69.6 percent very concerned/20.7 percent somewhat concerned); and
- 86 percent of organic farmers said they were concerned that GMO pollen drift will impact their certification or ability to continue organic farming (64 percent very concerned/22 percent somewhat concerned).

The network externality of drift adversely impacted some of the surveyed organic farmers:

- 21 percent of the organic farmers indicated they had to sell some of their product as non-organic as a result of drift;
- 19 percent of organic farmers reported they had opted not to sell some of their product as a result of drift;
- 6 percent reported that they were not allowed to sell their product for human consumption as a result of drift; and
- 4 percent reported that they lost their organic certification (in whole or part) as a result of drift.

³⁰ *Id.*

³¹ *Id.* at 70.

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Another risk in switching to organic, besides contamination from neighbors' non-organic crops, is patented seed producers (e.g., Monsanto) suing the organic farmer for patent infringement. Thus, many farmers in the survey identified complications in switching to organic production. Nearly half, for example, identified that the contamination risk from nearby non-organic operations was too high.

Table 1

| Please indicate whether the following factors are influencing your decision whether to adopt organic production. | | | | | |
|---|-----------------------|-----------------------|----------------|--------------------------|--------------------------|
| | Strongly agree | Somewhat agree | Neutral | Somewhat disagree | Strongly disagree |
| <i>Organic farming is too expensive</i> | 15.69% | 28.03% | 28.45% | 14.23% | 13.60% |
| <i>Other practices required for organic certification are too complicated for our operation</i> | 27.25% | 32.70% | 24.95% | 9.64% | 5.45% |
| <i>Organic seed is not reliably available</i> | 9.75% | 17.80% | 41.53% | 15.04% | 15.89% |
| <i>Organic products will not reliably produce enough income for our operation</i> | 17.78% | 18.41% | 30.13% | 16.11% | 17.57% |
| <i>The contamination risk from nearby non-organic operations is too high</i> | 26.56% | 21.58% | 30.91% | 10.37% | 10.58% |
| <i>Our customers do not want organic produce</i> | 7.97% | 10.06% | 34.59% | 16.98% | 30.40% |
| <i>Our operation is too big to switch to organic</i> | 4.42% | 8.42% | 36.21% | 14.32% | 36.63% |
| <i>Other family members (2nd generation) are motivated to transition</i> | 6.98% | 12.26% | 57.29% | 8.25% | 15.22% |
| <i>Customer demand for organic is very strong</i> | 26.40% | 24.74% | 27.65% | 9.98% | 11.23% |
| <i>We'll get higher prices for organic products</i> | 25.05% | 32.00% | 25.47% | 8.42% | 9.05% |
| <i>We want to transition from corporate farming</i> | 10.83% | 9.55% | 57.75% | 6.16% | 15.71% |

Only 11 percent of the surveyed corn growers said they would probably transition to organic. Again, the network externality was at play: 58 percent of corn growers reported that the contamination risk from nearby non-organic operations was too high. This is despite 54 percent of corn growers believing that they would get higher prices for organic products. Likewise, only 13 percent of the surveyed soybean

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growers said they would probably transition to organic. Again, 60.5 percent of soybean growers reported that the contamination risk from nearby non-organic operations was too high. This is despite 58 percent of soybean growers believing that they would get higher prices for organic products.

These costs have significant implications. The U.S. in 2016 had about a \$1.1 billion trade *deficit* for organic food.³² Among the top U.S. organic imports in 2016 were corn and soybeans (to meet the growing demand for organic livestock feed and organic meat).³³

Thus, even if Bayer divested its Liberty and LibertyLink assets to BASF, it is unclear how the divestiture will prevent price increases in the near future. Many crop farmers already use seeds with Monsanto's popular traits, and their neighbors also use these seeds with Monsanto traits. With these switching costs and network externalities, Bayer/Monsanto could likely raise the price of some of its traits or seeds without many farmers readily switching.

ii. The Increasing Concentration Has Reduced Seed Choice, Variety, and Seed Diversity on Species

Besides price, another important factor for many farmers in their seed purchasing decisions is variety. Ideally, in a competitive market, farmers can obtain the right mix of traits and performance for their area's particular climate and soil and their particular needs.

Across the board, a large majority of surveyed farmers feel that regionally adapted seed varieties are critical given increasing climate variability (58 percent strongly agreed with the statement/23 percent somewhat agreed). In thinking about their seed purchasing orders, the surveyed farmers were asked to pick the three most important factors in their decision-making. One key factor, as Table 2 reflects, is the seed's suitability for that geography/local climate. Other key factors are the seed's tolerance traits and appropriateness to soil type.

³² According to the USDA, U.S. organic exports that are tracked—mostly fruit and vegetables—reached \$548 million in 2016, while U.S. organic imports that are tracked equaled \$1.65 billion. USDA, Organic Trade (last updated Jan. 19, 2018), <https://www.ers.usda.gov/topics/natural-resources-environment/organic-agriculture/organic-trade/>.

³³ *Id.*

Table 2

| Thinking about your seed purchasing orders, pick the three most important factors in your decision making | Conventional Farmers | | Conventional Vegetable Farmers | | Conventional Field Crop Farmers | | Organic Farmers | |
|---|----------------------|------|--------------------------------|------|---------------------------------|------|-----------------|------|
| | % Response | Rank | % Response | Rank | % Response | Rank | % Response | Rank |
| <i>Geography/local climate</i> | 45.2% | 1 | 53.0% | 1 | 34.4% | 6 | 50.0% | 2 |
| <i>Previous experience with variety</i> | 42.5% | 2 | 38.4% | 2 | 41.6% | 2 | 43.6% | 3 |
| <i>Price</i> | 42.0% | 3 | 30.8% | 5 | 58.4% | 1 | 17.0% | 8 |
| <i>Tolerance Traits</i> | 33.4% | 4 | 30.3% | 6 | 39.0% | 3 | 27.3% | 5 |
| <i>Appropriateness to soil type</i> | 32.7% | 5 | 31.9% | 4 | 36.4% | 4 | 20.3% | 7 |
| <i>Time to maturity</i> | 28.8% | 6 | 20.5% | 8 | 36.4% | 5 | 22.7% | 6 |
| <i>Availability</i> | 22.4% | 7 | 21.1% | 7 | 25.3% | 7 | 27.6% | 4 |
| <i>Organic</i> | 21.4% | 8 | 35.1% | 3 | 7.1% | 9 | 75.5% | 1 |
| <i>Other</i> | 11.8% | 9 | 15.1% | 9 | 4.6% | 10 | 11.2% | 9 |
| <i>Pesticide drift concerns</i> | 7.6% | 10 | 8.1% | 10 | 9.1% | 8 | 5.5% | 10 |

Thus, for many farmers, variety can be as, if not more, important as price. This is consistent with antitrust law. Mergers can reduce competition on price and non-price parameters. Mergers that reduce variety can be as, if not more, harmful than mergers that lead to higher prices: “If the merged firm would withdraw a product that a significant number of customers strongly prefer to those products that would remain available, this can constitute a harm to customers *over and above* any effects on the price or quality of any given product.”³⁴

Bayer promises that its acquisition of Monsanto will provide farmers with greater variety of seeds and traits to meet their needs. This was a familiar refrain, when the Big Five acquired other seed companies.³⁵ So has greater consolidation delivered

³⁴ U.S. Dep’t of Justice & Federal Trade Commission, Horizontal Merger Guidelines § 6.4 (Aug. 19, 2010), <https://www.justice.gov/atr/horizontal-merger-guidelines-08192010#2i> (emphasis added).

³⁵ iPES Food Report, *supra* note 8, at 56.

greater variety?

Again no. As many farmers observed, variety, seed diversity, and choices have diminished, as the industry became more concentrated. According to the surveyed farmers, seed genetics for breeding have not improved in the last decade: 70 percent report that seed genetics have stayed the same or diminished (47 percent report they have diminished). Fifty-four percent of conventional field crop farmers report that seed genetics have stayed the same or diminished. In addition, 61 percent of farmers agree that “we have fewer seed variety options than 5 years ago.”

These concerns are not new. In the 2010 DOJ-USDA workshops, “[m]any farmers spoke about the high price of genetically modified seeds, restrictions on the use of genetically modified seeds, and a dearth of choices of genetically modified and conventional seeds.”³⁶ Many “lamented a lack of options in buying seeds.”³⁷ A farmer noted how the advent of genetically modified seeds “has reduced my options for non-GMO seeds” and “increased my costs to raise corn.”³⁸ The concern is that the increase in concentration brought a dearth of choices of genetically-modified and conventional seeds.³⁹ It is harder for farmers to find conventional seeds that meet their needs, and on consumers who prefer non-genetically engineered foods.

Again, these concerns are consistent with the underlying concerns of our competition laws. In concentrated markets, the anticompetitive effects can not only be higher prices, but the dominant firms’ ability to influence the path of innovation.⁴⁰ The Big Five currently dominate their sector’s R&D spending.⁴¹ They “can influence crop practices and the environmental impact of crops,” and “impact food quality in terms of composition, nutritional aspects, and diversity.”⁴² As the Big Five seed producers also sell pesticides, “many people worry about a tightening of the link between

³⁶ U.S. Dep’t of Justice, *Competition and Agriculture: Voices from the Workshops on Agriculture and Antitrust Enforcement in our 21st Century Economy and Thoughts on the Way Forward* 13 (May 2012), <https://www.justice.gov/sites/default/files/atr/legacy/2012/05/16/283291.pdf>.

³⁷ *Id.* at 6.

³⁸ *Id.* at 13-14.

³⁹ Kristina Hubbard, *Out of Hand: Farmers Face the Consequences of a Consolidated Seed Industry, Farmer to Farmer Campaign on Genetic Engineering* 5 (Dec. 2009).

⁴⁰ See, e.g., Maurice E. Stucke, *Should the Government Prosecute Monopolies?*, 2009 UNIVERSITY OF ILLINOIS LAW REVIEW 497.

⁴¹ iPES Food Report, *supra* note 8, at 55 (noting that in 2010 the “top eight seed/biotech companies accounted for 76% of all R&D spending in this sector”).

⁴² Bonny, *supra* note 8.

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agrochemicals and seeds that runs counter to the general desire for a decreased use of pesticides.”⁴³ As the International Panel of Experts on Sustainable Food Systems (iPES-Food) found:

The scope of research and innovation has narrowed as dominant firms have bought out the innovators and shifted resources to more defensive modes of investment. Increasing market concentration has reinforced a focus on input traits and major crops promising greater returns on investment. Companies have shifted R&D resources to the least risky modes of investment, e.g. focused on protecting patented innovations and creating barriers to entry. Meanwhile an explosion of new product lines is providing an illusion of innovation in processing and retail – but often amounts to little more than the repackaging of existing products. Genuine innovation is emerging from start-ups, but tends to be diluted as smaller brands and companies are bought out by mega-firms.

. . . Furthermore, horizontal and vertical integration is driving a reduction in seed and livestock genetic diversity, while increasing the risks of foodborne and livestock disease proliferation in increasingly centralized and homogenized systems.⁴⁴

Thus, one concern is that after the Big Five acquired so many independent conventional and hybrid seed producers, they significantly constrained non-biotechnology (i.e., conventional) commodity crop seed lines.⁴⁵ After the independent

⁴³ *Id.*

⁴⁴ iPES Food Report, *supra* note 8, at 9; *see also id.* at 56-57; Bonny, *supra* note 8:

. . . many actors and organizations fear that concentration of the seed industry will have other negative consequences that could aggravate price issues. Such issues can, for example, be aggravated by focusing plant breeding activities on seeds whose markets are the most important in value, and by directing plant breeding towards traits with quick profitability rather than towards greater long-term sustainability in agriculture, which would result in a decrease in valuable innovations. In addition, there is the risk of an increase in the dependence of SMEs on the three most important seed companies because of the numerous patents held by the latter, and because of licensing agreements. Indeed, large seed companies highly dependent on financial markets and short term profits may focus mainly on major crops and some niche-markets that allow for high profits. This focus raises questions on these companies’ capacity to create and put on the market new varieties for various crops suited to the vast diversity of soil, climate, agroeconomic and socioeconomic conditions, and affordability by all farmers.

⁴⁵ Letter dated May 31, 2016 from AAI et al. to Renata Hesse, Principal Deputy Assistant Attorney General, U.S. Dep’t of Justice Antitrust Division,

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seed companies have been purchased, “that particular dealer will only push the parent company’s products - genetics, weed and insect control, etc. - even though they might not be as good for a producer’s operation.”⁴⁶

So not only have the earlier acquisitions in the seed, trait, and pesticide markets led to higher prices, the accelerating trend toward concentration resulted in the farmers and independent seed producers being increasingly dependent on the Big Five firms for innovation in germplasm, traits, and pesticides. With greater industry concentration, farmers’ choices were reduced.

Consequently, if Bayer acquires Monsanto, the structural remedy (namely transferring assets to another Big Four agrochemical firm) will not change the dominant firms’ incentives. The further consolidation will concentrate R&D spending in the Big Four. They will likely continue focusing their R&D spending on crops, seeds, traits, and pesticides with a greater profit potential. This will benefit the Big Four’s profit margins, but not necessarily the farmers. With the Big Four primarily driving the path of R&D, even less time and resources will be spent on innovations that while not helping the companies’ bottom line provide farmers the crop varieties or social innovations that benefit them (and society).

Indeed, the rise of digital farming can further foreclose paths for innovation. Both Bayer and Monsanto are currently investing in digital agriculture, which “consists in the collection of data and information about farms with the aim of providing tailored advice or aggregated data to farmers.”⁴⁷ One of Monsanto’s divisions, for example, collects, stores, and visualizes farmers’ critical field data, monitors and measures the impact of their agronomic decisions on crop performance, and manages their field variability by building customized fertility and seeding plans for their fields to optimize yield and maximize profit.⁴⁸

http://www.antitrustinstitute.org/sites/default/files/AAI%20F%26WW%20NFU_Dow-Dupont_5.31.16_0.pdf.

⁴⁶ Matthew Wilde, *Independent Seed Companies A Dying Breed*, THE COURIER, May 31, 2009, http://wfcourier.com/business/local/independent-seed-companies-a-dying-breed/article_7cef1ffc-b0bb-56a8-8d83-faf894bf76ad.html.

⁴⁷ EC Press Release, *supra* note 6.

⁴⁸ The Climate Corporation, Climate Fieldview, <https://climate.com/> (last visited March 3, 2018).

The effects of Big Data on farming can be transformational: “For the first time, growers can understand exactly where pests, weeds and diseases are, in real time, as well as the state of the soil where their crops are growing.”⁴⁹ As we discuss elsewhere, the volume, variety, and velocity of Big Data can offer significant value.⁵⁰ But it can also help dominant platforms attain or maintain market power. As digital farming takes off, those who collect and analyze the farmers’ data can have significant power. Near real-time access to data may be necessary to effectively compete. Indeed, the race among the Big Four (if this acquisition goes through) will be to increase the farmers’ dependence on the Big Four’s digital platforms, where based on the data collected, farmers will rely more (rather than less) on the Big Four’s traits, seeds, and pesticides for their increasingly automated precision farming.

III. Why the DOJ Should Block Bayer’s Acquisition of Monsanto

The DOJ has ample evidence to challenge the transaction. Competition laws seek to prevent mergers to monopoly and prevent anticompetitive harm in its incipiency. Indeed, ignoring the Clayton Act’s incipiency standard raises significant rule-of-law concerns. Congress, in passing Section 7 of the Clayton Act and in amending it with the Celler-Kefauver Anti-Merger Amendments, “was concerned with arresting concentration in the American economy, whatever its cause, in its incipiency.”⁵¹ To halt the “‘rising tide’ of concentration in American business,” Congress decided “‘to clamp down with vigor on mergers.’”⁵² Congress’s premise was that mergers tend to accelerate concentration in an industry:

The use of these words [“may be”] means that the bill, if enacted, would not apply to the mere possibility but only to the reasonable probability of the prescribed [*sic*] effect * * *. The words ‘may be’ have been in section 7 of the Clayton Act since 1914. The concept of reasonable probability conveyed by these words is a necessary element in any statute which seeks to arrest restraints of trade in their incipiency and before they develop into full-fledged restraints violative of the Sherman Act. A requirement of certainty and actuality of injury to competition is

⁴⁹ Tobias Menne, Head of Digital Farming, Bayer, *Smart and Sustainable: Digitalisation Helps Farmers to Grow More with Less*, Global Cause, <http://www.globalcause.co.uk/world-food-day/smart-and-sustainable-digitalisation-helps-farmers-to-grow-more-with-less> (last visited March 3, 2018).

⁵⁰ MAURICE E. STUCKE & ALLEN P. GRUNES, *BIG DATA AND COMPETITION POLICY* (Oxford University Press 2016).

⁵¹ *United States v. Pabst Brewing Co.*, 384 U.S. 546, 552 (1966).

⁵² *Id.* (quoting *United States v. Von’s Grocery Co.*, 384 U.S. 270, 276 (1966)).

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incompatible with any effort to supplement the Sherman Act by reaching incipient restraints.⁵³

Since Section 7 of the Clayton Act seeks to arrest anticompetitive tendencies in their incipiency, it is well settled that to establish a Clayton Act violation, the government need not prove that the merger *will* cause higher prices or other anticompetitive effects. The “intense congressional concern” with economic concentration counseled against requiring “elaborate proof of market structure, market behavior, or probable anticompetitive effects.”⁵⁴ As the Supreme Court stated,

a merger which produces a firm controlling an undue percentage share of the relevant market, and results in a significant increase in the concentration of firms in that market is so inherently likely to lessen competition substantially that it must be enjoined in the absence of evidence clearly showing that the merger is not likely to have such anticompetitive effects.⁵⁵

Even with the proposed divestiture, Bayer’s acquisition of Monsanto would increase concentration in already highly concentrated markets. Moreover, Monsanto is already a monopoly in some of these seed, trait, and pesticide markets. The European Commission, for example, stated that “Monsanto has a dominant position in several traits markets worldwide.”⁵⁶ Bayer is “one of the few competitors to Monsanto in certain traits markets.”⁵⁷ Thus, the merger is presumptively anticompetitive.

Farmers have already paid the price of the increasing concentration in the seed, trait, and pesticide markets. The proposed divestiture to another Big Five firm will not restore competition. Instead, the evidence, including the farmers’ concerns, all suggest that the merger will likely lead to higher prices, less variety, and less innovation. The farmers’ concerns can be powerful evidence of the merger’s illegality. As the antitrust agencies note, “The conclusions of well-informed and sophisticated

⁵³ *Brown Shoe Co. v. United States*, 370 U.S. 294, 323 n.39 (1962) (quoting Senator Reed from the Congressional Record).

⁵⁴ *United States v. Phila. Nat’l Bank*, 374 U.S. 321, 363 (1963).

⁵⁵ *Id.*; see also *Polypore Int’l, Inc. v. Federal Trade Commission*, 686 F.3d 1208, 1213-14 (11th Cir. 2012).

⁵⁶ EC Press Release, *supra* note 6; see also *Jenson & McIntosh*, *supra* note 28, at 69 (“In the United States about 93% of soybeans are produced using seeds that contain Monsanto’s patented Roundup Ready One (RR1) and Roundup Ready Two (RR2) traits.”).

⁵⁷ EC Press Release, *supra* note 6.

customers on the likely impact of the merger itself can also help the Agencies investigate competitive effects, because customers typically feel the consequences of both competitively beneficial and competitively harmful mergers.”⁵⁸ Even if Bayer offered divestitures and behavioral remedies, the industry nonetheless will become even more concentrated, increasing the economic, social, and political risks from concentrated economic power. Accordingly, consistent with the Clayton Act’s incipiency standard, the United States should enjoin the Bayer-Monsanto merger.

A. Ineffectiveness of Behavioral Remedies

Behavioral remedies (basically telling the firms what to do or not do), as the current head of the DOJ’s Antitrust Division recognized, are generally ineffective:

Behavioral remedies often require companies to make daily decisions contrary to their profit-maximizing incentives, and they demand ongoing monitoring and enforcement to do that effectively. It is the wolf of regulation dressed in the sheep’s clothing of a behavioral decree. And like most regulation, it can be overly intrusive and unduly burdensome for both businesses and government.⁵⁹

Behavioral remedies are also disfavored because they generally do not restore competition or remedy the competitive harm.⁶⁰ Accordingly, the Assistant Attorney

⁵⁸ 2010 Horizontal Merger Guidelines, *supra* note 34, at § 2.2.2.

⁵⁹ Makan Delrahim, Assistant Attorney General Antitrust Division, U.S. Dep’t of Justice, Antitrust and Deregulation--Remarks as Prepared for Delivery at American Bar Association Antitrust Section Fall Forum (Nov. 16, 2017), <https://www.justice.gov/opa/speech/file/1011941/download> [hereinafter Delrahim Speech].

⁶⁰ *See, e.g., ProMedica Health Sys., Inc. v. Federal Trade Commission*, 749 F.3d 559, 573 (6th Cir. 2014) (noting that conduct remedies are disfavored because “there are usually greater long term costs associated with monitoring the efficacy of a conduct remedy than with imposing a structural solution”); Federal Trade Commission Bureau of Competition Staff Submission to the West Virginia Health Care Authority Regarding Cooperative Agreement Application of Cabell Huntington Hospital Pursuant to W. Va. Code §§ 16-29B-26, 28-29, dated April 18, 2016, 2016 WL 1638110, at *31 (“so-called ‘conduct-based’ remedies” are “temporary and limited in scope—like putting a band-aid on a gaping wound that will only continue to bleed (perhaps even more profusely) once the band-aid is taken off”) (quoting *Com. v. Partners Healthcare Sys., Inc.*, No. SUCV2014-02033-BLS2, 2015 WL 500995 (Mass. Super. Jan. 30, 2015)); John E. Kwoka, Jr., *Does Merger Control Work? A Retrospective on U.S. Enforcement Actions and Merger Outcomes*, 78 ANTITRUST L.J. 619, 636, 641 (2013) (noting that behavioral remedies typically require post-merger monitoring and administration, are often viewed as less effective than divestitures, and, based on an empirical analysis of post-merger retrospectives, are substantially less effective than structural remedies, with post-merger price increases twice as large as in the case of divestitures).

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General laid out a more coherent standard of when the Antitrust Division might accept behavioral remedies: “In certain instances where an unlawful vertical transaction generates significant efficiencies that cannot be achieved without the merger or through a structural remedy, then there’s a place for considering a behavioral remedy if it will completely cure the anticompetitive harms.”⁶¹

Bayer, to get its acquisition approved, will likely agree to behavioral remedies. But Bayer will unlikely show (a) how its acquisition would generate significant efficiencies that would benefit the farmers, and (b) how the behavioral remedies would completely cure the anticompetitive harms.

To see why, let us consider an earlier decree. In 2007, Monsanto, one of the largest sellers of traited cottonseed in the United States, sought to acquire Delta and Pine Land, the largest supplier of traited cottonseed in the United States. Not only was this a merger to monopoly in traited cottonseed, Monsanto would eliminate Delta and Pine Land as a potential independent partner for competing trait developers. The merger would substantially delay or prevent the development and introduction of cottonseed containing non-Monsanto traits. One concern was anti-stacking.⁶² Seed providers can “stack” different genetic traits into their own or other firms’ seeds.⁶³ Stacking can be pro-competitive. A stacking right, for example, would allow the developer of an insect-resistant trait to bring that trait to market in seed that contained another complementary trait, such as Monsanto’s Roundup Ready (or Roundup Ready Flex) herbicide-tolerant trait.⁶⁴ Most U.S. farmers chose, for example, “cottonseed that contains both an insect-resistant trait and an herbicide-tolerant trait.”⁶⁵ So, in a competitive market, seed developers could stack traits that meet farmers’ particular needs. If the seed is stacked with both Monsanto’s and Bayer’s herbicide-tolerant traits, for example, the crop is genetically modified to tolerate either herbicide. Either herbicide would kill the weeds. Neither would kill the crop.

⁶¹ Delrahim Speech, *supra* note 59.

⁶² Compl. ¶ 27, filed in *United States v. Monsanto Co.*, Case No. 1:07-cv-00992 (D.D.C. filed May 31, 2007).

⁶³ A seed, for example, can have one or more herbicide-tolerant traits, insect-resistant traits, etc. These traits are bred into the seed and effectively “stacked” on top of each other.

⁶⁴ Competitive Impact Statement at 8, filed in *United States v. Monsanto Co.*, Case No. 1:07-cv-00992 (D.D.C. filed May 31, 2007), <https://www.justice.gov/atr/case-document/competitive-impact-statement-154>.

⁶⁵ *Id.*

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As a result, farmers could buy whichever herbicide was cheaper or better suited to kill the particular weeds affecting their crop.

But this wasn't a competitive market in the late 1990s. Monsanto's traits had already dominated several important crops, including cotton. If the seed developer wanted the popular Roundup Ready herbicide-tolerant trait, it could not freely add other traits. To stack a trait on top of Roundup Ready, the seed developer needed Monsanto's permission. But Monsanto, in its trait licenses with nearly every cottonseed company, "severely restricted" these companies' ability "to work with other trait developers, with some licenses prohibiting stacking of Monsanto's traits with another company's traits."⁶⁶ By limiting or prohibiting stacking, Monsanto abused its power and foreclosed competitors. It also denied farmers a choice.

So, when Monsanto acquired Delta and Pine Land Company, the DOJ included, with the structural divestitures, a behavioral remedy. Monsanto had to modify its third-party cottonseed trait licenses "to remove restrictions on the ability of licensees to develop, market, or sell cottonseed containing traits of companies other than Monsanto, or to combine the licensed Monsanto traits in cottonseed with the traits of other companies."⁶⁷ As the DOJ told the court,

These changes will give these competing cottonseed companies the ability to partner with trait developers other than Monsanto without any financial penalty and to offer traits desired by farmers. Trait developers will thereby have access to close to half of the current U.S. cottonseed market, without having to deal with the combined Monsanto/DPL. These changes will ensure that Monsanto cannot prevent trait developers from bringing competing, non-Monsanto traits to the market.⁶⁸

Others disagreed.⁶⁹ Several States, for example, argued that the DOJ's structural and behavioral remedies would not curb Monsanto's monopolistic abuses. Monsanto would engage in exclusionary business practices post-merger, such as acquiring "independent seed companies and germplasm providers to enhance its monopoly

⁶⁶ *Id.*

⁶⁷ *Id.* at 2.

⁶⁸ *Id.* at 21.

⁶⁹ Plaintiff United States's Response to Public Comments, filed in *United States v. Monsanto Co.*, Case No. 1:07-cv-00992 (D.D.C. filed March 5, 2008), https://www.justice.gov/atr/case-document/plaintiff-united-states-response-public-comments-2#N_104.

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position in both seed and traits; long-term, highly restrictive licensing agreements that encourage the sale of Monsanto's biotech traits exclusively; licensing restrictions that prevent independent seed companies from combining Monsanto biotech traits with non-Monsanto traits; and bundling rebates on seeds, traits and chemicals to exclude competitors from retail distribution channels."⁷⁰ The DOJ, while making "no determination regarding the competitive effect of certain business practices," disagreed.⁷¹ Some "aspects of the proposed Final Judgment would make it difficult for Monsanto to engage in certain of the purportedly anticompetitive practices suggested by the States."⁷² The DOJ noted that its proposed Final Judgment required "Monsanto to remove anti-stacking provisions in its licenses to other seed companies and penalties for working with competing trait providers."⁷³ "Finally, and most fundamentally," the DOJ added, "the antitrust laws will continue to apply and would proscribe conduct by Monsanto that runs afoul of applicable legal standards."⁷⁴

The behavioral remedy did not curb Monsanto's monopoly power. Monsanto reportedly continued to prevent rivals from stacking their traits in other types of seeds.⁷⁵ Monsanto's restrictions, noted one rival, "deny farmers the choice of the best seeds to suit their needs and force Monsanto customers to rely solely on Monsanto technology."⁷⁶

Monsanto remains a gatekeeper. Its traits "appear in 72 percent of intra-firm stacks because of the firm's dominance in biotechnology markets."⁷⁷ Monsanto traits "appear in 91 percent of inter-firm stacks. All stacked traits in soybeans and cotton involve a

⁷⁰ *Id.*

⁷¹ *Id.*

⁷² *Id.*

⁷³ *Id.*

⁷⁴ *Id.*

⁷⁵ Lina Khan, *How Monsanto Outfoxed the Obama Administration: The inside story of how the government let one company squash biotech innovation, and dominate an entire industry*, SALON, March 15, 2013,

https://www.salon.com/2013/03/15/how_did_monsanto_outfox_the_obama_administration/; Editorial, *A Level Field*, N.Y. TIMES, Oct. 22, 2009, <http://www.nytimes.com/2009/10/23/opinion/23fri2.html>.

⁷⁶ Comments of DuPont/Pioneer Hi-Bred International Regarding Agriculture and Antitrust Enforcement Issues in Our 21st Century Economy (2010), at 21, <https://www.justice.gov/sites/default/files/atr/legacy/2010/03/04/254990.pdf>.

⁷⁷ Testimony of Diana L. Moss, President, American Antitrust Institute Before the Senate Judiciary Committee, "Consolidation and Competition in the U.S. Seed and Agrochemical Industry" at 9-10 n. 44 (Sept. 20, 2016), <https://www.judiciary.senate.gov/imo/media/doc/09-20-16%20Moss%20Testimony.pdf>.

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Monsanto trait whereas 50 percent of corn stacks involve Monsanto traits.”⁷⁸ Thus, if this merger is allowed, even with the proposed divestiture to BASF, Bayer/Monsanto would remain a gatekeeper. Bayer may allow the other Big Four members to stack some or all of their traits. Or, Bayer may demand terms which it otherwise could not absent its monopoly power. The DOJ would have a hard time to police these anticompetitive restrictions.

Another problem is when a seed producer needs to license a trait that either Bayer or Monsanto owns. One seed industry professional, for example, argued that “without access to Monsanto’s dicamba traits, BASF will not have the required resources to be a successful seed company.”⁷⁹ The DOJ could require Bayer/Monsanto to license on fair, reasonable, and non-discriminatory (FRAND) terms. But when FRAND licensing runs against a monopolist’s incentives, it can circumvent this obligation. As the market is further concentrated, any licensee remains beholden to the dominant platform.

A third concern is exclusionary conduct post-merger. Even with the divestiture to BASF, Bayer would have a far greater product offering. Monsanto already dominates many segments. Thus, Bayer can leverage this power to foreclose smaller rivals, to the detriment of farmers. As one trade publication observed:

The breadth of Bayer and Monsanto’s product offerings can deter distributors from carrying the products of niche players, particularly if the integrated companies bundle their products. Their advantage over non-integrated seed breeders or chemical manufacturers is that Bayer and Monsanto are able to “offer directly to the distributor a full package from seed to harvest,” explained the executive at a small chemical manufacturer and distributor. “It could be difficult for a company like ours to place our products, since a distributor would prefer to have the full offering,” he added. As a result of the merger, Bayer would be in a position to market an even more robust offering to distributors, which would make it increasingly difficult for a distributor to refuse the bundled products.

According to an industry veteran with experience both in manufacturing and in distribution management, “Distributors look at [seeds and crop

⁷⁸ *Id.*

⁷⁹ Capitol Forum, *Bayer/Monsanto: Despite Potential Weaknesses, BASF Divestiture Likely Resolves Many EC/DOJ Concerns; Vegetable Seed, Innovation Concerns Linger* (Nov. 13, 2017).

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protection] as being integrated. We get squeezed out of a number of [distributors] because we don't have [an integrated product line].”⁸⁰

In the 2018 survey, the farmers were asked whether, in the past five years, any of their seed retail sources or distributors switched to offering seed from only *one* manufacturer. Thirty-one percent replied yes. Half of the farmers reported they have three or fewer retail options for seeds. However, there is a stark difference between conventional farmers serviced by the Big Five and organic farmers. The surveyed conventional farmers generally had few retail options for seed (60.5 percent of conventional grain crop farmers and 61.5 percent of conventional vegetable crop farmers reported having three or fewer purchase site options). In contrast, organic farmers had more options (only 40 percent of organic farmers reported having three or fewer retail options).

As the divestiture won't address these concerns, the DOJ could ignore them, assume it can target the anti-competitive behavior post-merger, or try behavioral remedies. None will likely be effective.

In short, behavioral remedies do a very poor job to replicate the lost competition. Whereas in a competitive market, a licensee can turn (or at least viably threaten to turn) to alternatives, that option is lost in highly concentrated markets. Behavioral remedies will not prevent the likely higher prices and the loss in variety and choice, post-merger.

B. The Structural Remedy Will Not Promote Competition

As the current head of the Antitrust Division aptly noted, “if a merger is illegal, we should only accept a clean and complete solution.”⁸¹ While a structural remedy is often preferable over behavioral remedies, it is unlikely that Bayer's divestiture to BASF entails a clean solution.

We discussed already why Bayer's proposed divestiture will not likely lower prices and increase choice and variety for farmers. Given the vertical and horizontal components in the trait, seed, and pesticide markets, it is questionable whether the

⁸⁰ Capitol Forum, *Bayer/Monsanto: A Closer Look at Integrated Platform Competition, Innovation Issues* (Sept. 1, 2017).

⁸¹ Delrahim Speech, *supra* note 59.

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divestiture will actually restore competition. The fundamental problem is that shifting assets from one oligopolist to another will not restore competition.

BASF, since 2007, has had a number of research collaboration and licensing agreements with Monsanto and other seed companies. Monsanto and BASF, for example, have been collaborating for many years on new formulations of dicamba-based herbicides. (Arkansas recently banned the controversial herbicides, given the extensive damage caused in 2017 when the products evaporated and drifted to crops that could not resist them.⁸² Other states, including Minnesota, Missouri, and North Dakota, have imposed limits on dicamba sprayings to reduce their potential damage to other crops.⁸³) BASF would receive Bayer's Liberty herbicides that compete with these dicamba-based herbicides. So, BASF will unlikely promote one type of herbicide, if doing so lowers the other's (and the firm's) overall profits.

The Big Five firms, besides publicly disclosing their R&D pipelines and future rollout targets for their products, also have significant joint ventures and licensing agreements with each other. The iPES Report discussed how agreements among the now Big Five on research and innovation adversely affect governance and power in the food systems:

- **Cross-licensing of Intellectual Property** – The Big Six [now the Big Five] frequently rely on exclusive monopoly patents to share proprietary traits and technologies. The patent owner determines whether or not to license, or selectively license, their products, and how much to charge. . . . These [licensing] agreements can be used to leverage dominant market share in patented traits by restricting access, controlling product introduction and limiting innovation. . . .

⁸² Tom Polansek, *Arkansas Restricts Controversial Monsanto, BASF Farm Chemical*, REUTERS, Jan. 19, 2018,

<https://www.reuters.com/article/us-usa-pesticides-arkansas/arkansas-restricts-controversial-monsanto-basf-farm-chemical-idUSKBN1F82D9>. BASF develops improved plant characteristics such as drought tolerability but has relied “on partners, the biggest being Monsanto, to bring finished seed products to market. The two groups have been collaborating in plant research and development since 2007, with BASF contributing about 150 million euros in expenditure per year.” Ludwig Burger, *Monsanto and BASF May Reap More from Partnership After Syngenta Sale*, REUTERS, Feb. 5, 2016, <https://www.reuters.com/article/us-monsanto-basf-collaboration/monsanto-and-basf-may-reap-more-from-partnership-after-syngenta-sale-idUSKCN0VE1CR>.

⁸³ *Id.*

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- **R&D alliances** – For example, BASF and Monsanto have collaborated on R&D partnerships worth \$2.5 billion since 2007. The companies have collaborated on six R&D projects: breeding, biotechnology, pesticides, agricultural biologicals, and precision agriculture.
- **Genetic trait agreement** – Five of the Big Six companies have forged agreements amongst each other that lay out the rules for access to genetic biotechnology traits at patent expiration. According to ETC Group (2013), these agreements are developed to mollify anti-trust regulators while advancing companies' collective market control, moving the sector towards a 'post-patent regulatory regime' heavily influenced by corporate decision-making.⁸⁴

Bayer's divestiture to BASF will not alter the cross-dealings among the remaining Big Four. Independent seed producers account for a small percentage of the soybean and corn seed sales.⁸⁵ Of the remaining independent seed producers, many are dependent on the Big Five firms. Many independents that sell corn and/or soybean seed, for example, do not have their own trait development program or their own breeding programs for developing germplasm.⁸⁶ They have cross-licensing agreements with the Big Five to sell seeds with specific combinations of traits.⁸⁷ Monsanto, for example, licenses its germplasm and traits to approximately 200 seed companies and distributors across the U.S. – allowing them to integrate Monsanto seed germplasm and/or biotech traits into their own brands of corn, soybean, cotton, sorghum, and canola seeds, among others.⁸⁸ These cross-licensing agreements can be used to foreclose rivals and emerging competitive threats.

Consequently, BASF is not likely to be a maverick post-merger. As BASF told its investors, its aim for 2018 is “to exploit positive market momentum, especially in the emerging markets, significantly increase sales volumes with innovative solutions and *raise our prices*.”⁸⁹ BASF is not alone. DowDuPont is not a maverick. It recently told investors that its “double-digit sales increase was driven by broad-based volume

⁸⁴ iPES Food Report, *supra* note 8, at 24.

⁸⁵ DuPont/Pioneer Comments, *supra* note 76, at 9.

⁸⁶ *Id.* at 8.

⁸⁷ Food & Water Watch Letter, *supra* note 20, at 15.

⁸⁸ K. Sauer, *What is Corn States?*, Monsanto, Dec. 8, 2009.

⁸⁹ BASF Report 2017, at 123, http://report.basf.com/2017/en/servicepages/downloads/files/BASF_Report_2017.pdf (emphasis added).

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growth in all operating segments and geographies, and price gains in all geographies . . . [l]ocal price rose 5% as [it] drove pricing initiatives in all geographies in response to higher raw material costs and tighter supply-demand fundamentals.”⁹⁰ DowDuPont’s only pricing pressure, from “primarily generic” products, was “coming out of Latin America and mostly aimed at the fungicide portfolio.”⁹¹

There simply comes a point when the industry becomes so concentrated and integrated (through cross-licensing deals, joint ventures, and other ventures), that structural and behavioral remedies will not do the trick. One recent example is when Halliburton sought to acquire Baker Hughes. To mollify the DOJ, Halliburton proposed divesting a bundle of assets. But the proposed divestitures, the United States noted, “would have lower sales volume and lower market share, be less efficient, have less research and development, provide fewer innovations and customized solutions, be less able to offer integrated solutions, and otherwise fail to replicate the competition provided by Defendants’ businesses from which they would be extracted.”⁹² The proposed remedy also would have imposed “an unprecedented burden on the Court and the United States, as it would require oversight of the global separation and transfer of thousands of assets and employees, as well as the performance of numerous service agreements for years into the future.”⁹³ Moreover, despite the divestitures, the merger would reduce “competition over innovation and new product development.”⁹⁴ Thus, the United States sought to enjoin the transaction, as Halliburton’s proposed remedy was “wholly inadequate to resolve the risks to competition posed by this transaction.”⁹⁵ Halliburton and Baker Hughes thereafter abandoned the deal.

One could try to distinguish Bayer’s proposed divestiture as simpler and less risky. But the underlying assumption remains that an antitrust agency can effectively promote innovation and restore competition by shifting assets from one oligopolist to another. As the next section discusses, this approach has failed.

⁹⁰ DowDuPont Inc. Earnings Call-Q4 2017 (Feb. 1, 2018), <https://www.fool.com/earnings/call-transcripts/2018/02/05/dowdupont-inc-dwdp-q4-2017-earnings-conference-cal.aspx> .

⁹¹ *Id.*

⁹² Complaint, United States v. Halliburton Co., Case 1:16-cv-00233-UNA (D. Del. filed Apr. 6, 2016), <https://www.justice.gov/atr/file/838661/download> .

⁹³ *Id.*

⁹⁴ *Id.*

⁹⁵ *Id.*

C. The Failures of “Antitrust Light” in Allowing Greater Concentration

Of course, if the antitrust agencies enforced the Clayton Act’s incipency standard, we would not be faced with this merger. The agencies would have halted the trend toward concentration (and ensuing price increases and variety losses) years ago. This reflects the failure of the Chicago School and post-Chicago School economic theories.

Over the past 35 years, it was fashionable among antitrust economists and lawyers to dismiss the Clayton Act’s incipency standard as outdated. Before the financial crisis, the conventional wisdom was that antitrust enforcers and courts could (and should) use concentration only as a screen: the antitrust agencies would challenge only those few mergers that, under the prevailing economic thinking, would demonstrably lead to a post-merger price increase. Even here, the antitrust agencies, under their “light touch” antitrust, relied primarily on limited structural divestitures on horizontal overlaps and behavioral remedies on vertical overlaps. Accordingly, the antitrust agencies over the past 35 years have blocked few horizontal mergers, and even fewer vertical mergers. The belief was that the structural and behavioral remedies would prevent any anticompetitive effects while consumers would benefit from the mergers’ efficiencies.

The evidence strongly suggests that this light-touch antitrust has not worked in the trait, seed, and pesticide markets. As the survey and other evidence evince, the increasing concentration has harmed farmers. Nor has light-touch antitrust protected farmers from the increasing concentration along the supply chain. The International Panel of Experts on Sustainable Food Systems discussed how the supply chain from farmers to consumers has become increasingly concentrated, leaving both farmers and consumers worse off:

Consolidation across the agri-food industry has made farmers ever more reliant on a handful of suppliers and buyers, further squeezing their incomes and eroding their ability to choose what to grow, how to grow it, and for whom. The emergence of increasingly dominant retail and processing firms has driven concentration along the chain in order to provide the requisite scale and volume, enforcing a de facto consolidation of agriculture. Meanwhile, upstream consolidation has left farmers hostage to a handful of suppliers and mounting commercial input costs. These trends have exacerbated existing power imbalances, allowing costs to be shifted onto farmers, squeezing their incomes,

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eroding their autonomy, and leaving them vulnerable to unilateral sourcing shifts. Despite the supposed efficiencies of a highly-consolidated agri-food industry, consumer food prices have not been systematically reduced – and tend to rise in highly concentrated markets.⁹⁶

Their report identifies unprecedented levels of market concentration throughout the agri-food industry:

- The three biggest farm machinery companies – Deere (USA), CNH (Netherlands), and Kubota (Japan) – accounted for almost half of global farm machinery sales in 2014.
- In the animal genetics industry, three companies supply 95 percent of the commercial breeding stock for broilers, two companies control an estimated 90 percent of layer poultry genetics worldwide, two companies supply virtually all the industrial turkey genetics worldwide, and three leading pig breeders supply almost all global pig stock.
- In the U.S., from 1993 to 2010, the share of hogs sold independently on cash markets dropped from 87 percent to 5-7 percent. The majority of hogs are now controlled either through direct corporate ownership or highly-restrictive production contracts by four meatpackers: WH/Smithfield, Tyson, JBS, and Cargill, many of whom own subsidiary processing companies around the globe. Throughout most of the U.S., pork producers only have access to one of these four firms, who collectively control 65 percent of the industry.
- Consolidation is also accelerating at the food processing and retail sectors. The top four U.S. food retailers, for example, accounted for just under 40 percent of national grocery sales in 2015 – double the four-firm concentration ratio from the early 1990s.⁹⁷

This increasing concentration along the supply chain, the experts found, has had at least eight negative impacts:

- Redistributing costs and benefits along the chain, and squeezing farm income;
- Reducing farmer autonomy in a context of ‘mutually-reinforcing consolidation’;

⁹⁶ iPES Food Report, *supra* note 8, at 7; *see also* PETER C. CARSTENSEN, COMPETITION POLICY AND THE CONTROL OF BUYER POWER: A GLOBAL ISSUE (Edward Elgar 2017).

⁹⁷ iPES Food Report, *supra* note 8, at 28-29, 33, 44.

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- Narrowing the scope of innovation through defensive and derivative R&D;
- Hollowing out corporate commitments to sustainability;
- Controlling information through a data-driven revolution;
- Escalating environmental and public health risks;
- Allowing labour abuses and fraud to slip through the cracks; and
- Setting the terms of debate and shaping policies and practices.⁹⁸

Nor has light-touch antitrust benefitted most Americans.⁹⁹ Competition is decreasing in many significant industries, as they become concentrated.¹⁰⁰ Greater profits are falling in the hands of fewer firms.¹⁰¹ “More than 75% of US industries have experienced an increase in concentration levels over the last two decades,” one recent study found.¹⁰² “Firms in industries with the largest increases in product market concentration have enjoyed higher profit margins, positive abnormal stock returns, and more profitable M&A deals, which suggests that market power is becoming an important source of value.”¹⁰³

New business formation as a share of the economy has steadily declined since the late 1970s. “In 1982, young firms [those five-years old or younger] accounted for about half of all firms, and one-fifth of total employment,” observed Jason Furman, then-Chairman of the Council of Economic Advisers.¹⁰⁴ But by 2013, these figures fell “to about one-third of firms and one-tenth of total employment.”¹⁰⁵

⁹⁸ *Id.* at 48.

⁹⁹ JOHN KWOKA, *MERGERS, MERGER CONTROL, AND REMEDIES: A RETROSPECTIVE ANALYSIS OF U.S. POLICY* 154-57 (MIT Press 2015).

¹⁰⁰ See, e.g., David Wessel, *Is Lack of Competition Strangling the U.S. Economy?*, HARVARD BUSINESS REVIEW (March–April 2018), <https://hbr.org/2018/03/is-lack-of-competition-strangling-the-u-s-economy>; Jonathan B. Baker, *Market Power in the U.S. Economy Today*, Washington Center for Equitable Growth (March 20, 2017), <http://cdn.equitablegrowth.org/wp-content/uploads/2017/03/16154837/032017-baker-antitrust-ib.pdf>; Gustavo Grullon et al., *Are U.S. Industries Becoming More Concentrated?* (Aug. 31, 2017), <https://ssrn.com/abstract=2612047>.

¹⁰¹ Jan De Loecker & Jan Eeckhout, *The Rise of Market Power and the Macroeconomic Implications* (Aug. 24, 2017), <http://www.janeeckhout.com/wp-content/uploads/RMP.pdf>.

¹⁰² Grullon et al., *supra* note 100.

¹⁰³ *Id.*

¹⁰⁴ Jason Furman, *Beyond Antitrust: The Role of Competition Policy in Promoting Inclusive Growth* (Sept. 16, 2016), https://obamawhitehouse.archives.gov/sites/default/files/page/files/20160916_searle_conference_competition_furman_cea.pdf.

¹⁰⁵ *Id.*

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Despite the higher returns to capital, businesses in markets with rising concentration and less competition are investing relatively less.¹⁰⁶ This investment gap, one study found, is driven by industry leaders who have higher profit margins.¹⁰⁷

Since the late 1970s, wealth inequality has grown,¹⁰⁸ and worker mobility¹⁰⁹ has declined. Labor's share of income in the nonfarm business sector was in the mid-60 percentage points for several decades after WWII, but that too has declined since 2000 to the mid-50s.¹¹⁰

Conclusion

Farmers were clearly in mind when the Sherman and Clayton Acts were enacted over a century ago. Congress offered a simple, clean, and administrable remedy to prevent the political, social, and economic harms from concentrated economic power: Simply say no. The United States should return to this simple remedy, rather than allow further consolidation on the empty promise that the Bayer-Monsanto merger will deliver lower prices, greater innovation, and more variety. As the farmer survey results reflect, and the empirical literature confirms, farmers have not significantly benefitted from these phantom efficiencies.

It is difficult to recreate competition through consent decrees. Industries, such as airlines, beer, and banking, reflect this failure. Should the antitrust agencies continue to allow highly concentrated industries to become even more concentrated, despite the evidence that the intended beneficiaries of these mergers have not benefitted, then that represents a significant policy failure. To allow this industry to further concentrate from the Big Five to Big Four would contravene the very purpose of the Clayton Act.

The farmers have spoken. Now it is up to the Department of Justice to enforce the law, and just say no.

¹⁰⁶ Germán Gutiérrez & Thomas Philippon, *Declining Competition and Investment in the U.S.*, NBER Working Paper No. 23583 (July 2017), <https://www.nber.org/papers/w23583>.

¹⁰⁷ *Id.*

¹⁰⁸ Facundo Alvaredo, Lucas Chancel, Thomas Piketty, Emmanuel Saez & Gabriel Zucma, *World Inequality Report 2018*, <http://wir2018.wid.world/files/download/wir2018-summary-english.pdf>.

¹⁰⁹ Council of Economic Advisers Issue Brief, *Labor Market Monopsony: Trends, Consequences, and Policy Responses* (Oct. 2016), https://obamawhitehouse.archives.gov/sites/default/files/page/files/20161025_monopsony_labor_mrkt_cea.pdf.

¹¹⁰ *Id.*

Appendix 1

Summary of Results of February 2018 Seeds and Chemicals Survey of Farmers

DESCRIPTION OF INSTRUMENT AND RESPONDENTS

Between January 26 and February 12, 2018, a coalition of farm groups¹ fielded an online survey on current market conditions in order to better inform them about the impact of consolidation in the agricultural seed and chemicals businesses.²

All told, 957 responses were collected from 48 states.³ Cumulatively, the respondents grow crops on close to 2 million acres.⁴

The respondents engage in a range of farming community practices and grow a variety of crops:

- 52.5 percent are exclusively vegetable farmers (29.6 percent conventional and 22.9 percent organic)⁵

¹ The survey instrument was crafted by coalition members. The following groups circulated the instrument to their members or networks: Agricultural Justice Project, California Farmers Guild, Center for Rural Affairs, City Seed, Community Alliance with Family Farmers, Domestic Fair Trade Association, Farmworker Association of Florida, Family Farm Defenders, Farm Aid, Farm and Ranch Freedom Alliance, Farmworker Association of Florida, Florida Organic Growers, Friends of Family Farmers, Hawai'i Farmers Union United, Hawai'i Tropical Fruit Growers, Iowa Farmers Union, International Federation of Organic Agriculture Movements, Kansas Rural Center, Maine Organic Farmers and Gardeners Association, Minnesota Farmers Union, Missouri Coalition for the Environment, National Family Farm Coalition, National Farmers Union, National Latino Farmers and Ranchers Trade Association, Natural Born Tillers, New Britain ROOTS, Northeast Organic Dairy Producers Alliance, Northeast Organic Farming Association of Connecticut, Northeast Organic Farming Association of Massachusetts, Organic Farmers Association, Organic Farming Research Foundation, Organic Seed Alliance, Organic Seed Growers and Trade Association, Organization for Competitive Markets, Our Family Farms, Pesticide Action Network North America, Practical Farmers of Iowa, Ranchers-Cattlemen Action Legal Fund, United Stockgrowers of America, Rural Coalition, Rural Vermont, Sustainable Food Center, Texas Organic Farmers and Gardeners Association, The Cornucopia Institute, Vilicus Farms, and the Women Food and Agriculture Network.

² In the spring of 2017, ChemChina bought Syngenta. In the fall of 2017, The Dow Chemical Company and E.I. du Pont de Nemours & Company merged. A proposed merger between Bayer AG and the Monsanto Company is pending.

³ There were no respondents from Delaware, the District of Columbia, and Rhode Island.

⁴ Respondents reported they operated a total of 1.96 million acres. The average was 2,051 acres, and median was 80 acres.

⁵ The top five crops grown are: 43.9 percent – tomatoes for fresh market; 42.9 percent – lettuce; 41.1 percent – beans; 40.7 percent – onions; 38.8 percent – bell peppers.

- 23.1 percent are exclusively grain crop farmers (18.1 percent conventional and 5.0 percent organic)⁶
- 39 percent of the respondents engage in organic farming
- 70.6 percent of all respondents work the majority of their time on a farming operation

TOP LINE FINDINGS

The results of the survey demonstrate that the ability of farmers to deliver healthy, quality food to Americans is under significant pressure.

- Prices for seed are going up.
- Seed quality and innovation is going down.
- Weeds are growing resistant to traditional chemicals, forcing farmers to adapt and use more expensive, chemical heavy, or time-consuming weed-management techniques.
- Moreover, many farmers are incurring damage or costs due to chemical or pollen drift from nearby operations.

The conditions faced by farmers and their experience with how previous mergers have impacted their operations combine to make them very concerned about the current wave of consolidation in the agricultural seed, traits, and chemicals business.

Concerns about Consolidation

- 93.7 percent of the survey's respondents⁷ are concerned about the proposed merger of Bayer and Monsanto. (82.8 percent are very concerned)

⁶ The top three crops grown are: 43.9 percent – corn for grain or seed; 38.8 percent – soybeans; 31.2 percent – wheat.

⁷ Unless otherwise indicated, findings are for all respondents. Charts at the end of this memorandum break out select questions by key segments. Also note some numbers may not tie due to rounding.

- 93.7 percent are concerned that the merger will negatively impact independent farmers and farming communities. (83.9 percent are very concerned)
- The top three farm practice concerns are:
 - The merged company will use its dominance in one product to push sales of other products: 79.6 percent very concerned/12.3 percent somewhat concerned
 - The merged company will control data about farm practices: 79.5 percent very concerned/12.2 percent somewhat concerned
 - The merger will result in increased pressure for chemically dependent farming: 77.1 percent very concerned/11.9 percent somewhat concerned
- For conventional grain crop farmers, price impacts displace chemically dependent farming as a top three concern. Their top three farm practice concerns are:
 - The merged company will use its dominance in one product to push sales of other products: 74.2 percent very concerned/18.0 percent somewhat concerned
 - Paying more for seeds: 72.0 percent very concerned/20.0 percent somewhat concerned
 - The merged company will control data about farm practices: 74.8 percent very concerned/16.5 percent somewhat concerned

Seed Pricing, Quality & Purchase Options

Price, Productivity & New Seed Varieties:

Farmers have been paying higher prices for seeds over the last decade. The survey confirmed that they perceive it. 80.2 percent agree that they have been paying higher prices, and 64.8 percent agree that they have less bargaining power for seeds and chemicals.

But the increased prices for new seed varieties have not been offset by increased productivity according to 63.9 percent of the respondents. The problem is felt most acutely by grain crop farmers.

- Grain crop farmers: 76.0 percent agree that productivity has not offset the increased price for seed.

Seed Purchasing Decisions:

Price is not necessarily the top factor for farmers in seed purchasing decisions.

The three most important factors for farmers in making their seed purchasing decisions are:

- Geography/local climate: 47.4 percent of respondents reported it as top three
- Previous experience with variety: 43.0 percent of respondents reported it as top three
- Price: 30.8 percent of respondents reported it as top three

However, there are differences in the top three among various segments of the respondents. See chart below breaking out four segments.

- Conventional grain crop farmers diverge from conventional vegetable farmers in how they rank the factors that go into their seed purchasing decisions. For them, price is top ranked (58.4 percent) and tolerance traits are third ranked (39.0 percent).
- In contrast, conventional vegetable farmers are more concerned about local climate factors and previous experience with the variety.

Table 1

| <i>Thinking about your seed purchasing orders, pick the three most important factors in your decisionmaking*</i> | <i>All Conventional Farmers</i> | | <i>Conventional Vegetable Farmers</i> | | <i>Conventional Field Crop Farmers</i> | | <i>Organic Farmers</i> | |
|--|---------------------------------|-------------|---------------------------------------|-------------|--|-------------|------------------------|-------------|
| | <i>% Response</i> | <i>Rank</i> | <i>% Response</i> | <i>Rank</i> | <i>% Response</i> | <i>Rank</i> | <i>% Response</i> | <i>Rank</i> |
| Geography/local climate | 45.2% | 1 | 53.0% | 1 | 34.4% | 6 | 50.0% | 2 |
| Previous experience with the variety | 42.5% | 2 | 38.4% | 2 | 41.6% | 2 | 43.6% | 3 |
| Price | 42.0% | 3 | 30.8% | 5 | 58.4% | 1 | 17.0% | 8 |
| Tolerance traits | 33.4% | 4 | 30.3% | 6 | 39.0% | 3 | 27.3% | 5 |
| Appropriateness to soil type | 32.7% | 5 | 31.9% | 4 | 36.4% | 4 | 20.3% | 7 |
| Time to maturity | 28.8% | 6 | 20.5% | 8 | 36.4% | 5 | 22.7% | 6 |
| Availability | 22.4% | 7 | 21.1% | 7 | 25.3% | 7 | 27.6% | 4 |
| Organic | 21.4% | 8 | 35.1% | 3 | 7.1% | 9 | 75.5% | 1 |
| Other | 11.8% | 9 | 15.1% | 9 | 4.6% | 10 | 11.2% | 9 |
| Pesticide drift concerns | 7.6% | 10 | 8.1% | 10 | 9.1% | 8 | 5.5% | 10 |

Seed Genetics & Varieties:

According to the respondents, seed genetics for breeding have not improved in the last decade. 69.7 percent report that seed genetics have stayed the same or diminished. (47.3 percent report they have diminished).

- 54.0 percent of conventional grain crop farmers report that seed genetics have stayed the same or diminished

In addition, 60.7 percent of respondents agree with the statement that “we have fewer seed variety options than 5 years ago.”

Need for Regionally Adapted Varieties:

Across the board, a large majority of respondents (81.5 percent) feel that regionally adapted seed varieties are critical given increasing climate variability. 58.4 percent strongly agreed with the statement/23.1 percent somewhat agreed.

Organic and vegetable farmers felt the need for regionally adapted seeds most acutely.

- Organic farmers: 70.0 percent strongly agree/15.5 percent somewhat agree
- Vegetable farmers: 66.0 percent strongly agree/19.0 percent somewhat agree

Seed Purchasing Options & Practices:

- In the last five years, while placing a seed order:
 - 20.6 percent of respondents found that the seed variety they wanted was not available
 - 14.6 percent felt very restricted in their options due to the desire for a particular trait
 - 12.5 percent had to accept a seed trait they did not want or need

- Pricing Practices

Conventional grain crop farmers reported a number of pricing and bundling practices over the last five years:

- 44.7 percent reported that one or more of their seed retail or distributors have switched to offering seed from only one manufacturer
- 34.3 percent reported that it was difficult for them to compare seed price points with other farmers. (25.5 percent indicated it was easy)
- 23.0 percent were offered a discount or rebate for using financing provided by the seed manufacturer
- 22.2 percent reported that they were offered a lower price (including discounts or rebates) if they also bought pesticides, herbicides, or other chemicals from the same manufacturer
- 20.1 percent reported having had to buy seed that included traits they did not want or need

Herbicide Pricing, Quality & Purchase Options

- Retail Sources
 - 60.7 percent of conventional grain crop farmers report having three or fewer herbicide retail or distributor sources
 - 67.7 percent of conventional vegetable crop farmers report having three or fewer herbicide retail or distributor sources

- Weed resistance is leading conventional grain crop farmers to alter their operations in a number of ways
 - 72.7 percent agree that they have had to spend more on herbicide chemicals because of weed resistance
 - In addition, they are adopting a wide variety of practices to deal with resistance:

Table 2

| <i>Thinking about weed resistance to synthetic herbicides, which of the following techniques are you using to manage weeds. (Check all that apply).</i> | |
|---|-------|
| We apply herbicides with multiple modes of action | 51.6% |
| We use cover crops | 43.0% |
| We rotate herbicide usage | 39.8% |
| We use tillage as a weed management tool | 34.4% |
| We buy new chemical formulations to combat weeds | 25.8% |
| We rotate herbicide tolerance traits in seeds | 18.8% |
| We intend to cut back herbicide usage and rely on other techniques | 13.3% |
| We use hand-weeding in addition to herbicide application | 13.3% |
| We use more herbicides | 12.5% |
| We use a cultivator in addition to herbicide application | 10.9% |
| We use more labor and equipment | 8.6% |
| Other | 7.8% |

Externalities/Drift Issues

The survey found that many farmers are forced to pay more, alter their operations, or change their practices as a result of drift.

Concerns about Drift:

- 90.2 percent of organic farmers said they were concerned that agrochemical (e.g. pesticides or herbicides) drift will impact their certification or ability to continue organic farming. (69.6 percent very concerned/20.6 percent somewhat concerned)

- 86.0 percent of organic farmers said they were concerned that GMO pollen drift will impact their certification or ability to continue organic farming. (64.2 percent very concerned/21.9 percent somewhat concerned)

Impact of Drift on Organic Farmers:

- 20.8 percent of organic farmers indicated they had had to sell some of their product as non-organic as a result of drift
- 18.9 percent of organic farmers reported they had opted not to sell some of their product as a result of drift
- 5.7 percent reported that they were not allowed to sell their product for human consumption as a result of drift
- 3.8 percent reported that they lost their organic certification (in whole or part) as a result of drift

Experience with Dicamba Drift:

- 14.3 percent of conventional grain crop farmers indicated they had experienced Dicamba drift in the last three years
- 23.9 percent of conventional grain crop respondents said they had not experienced Dicamba drift in the last three years but were concerned that they were at risk
- While 31.8 percent of all respondents report that Dicamba drift (or the risk of it) has not impacted their practices, the remainder report having undertaken a number of practices in response:

Table 3

| <i>If you experienced or recieved Dicamba drift or believe you are at risk of it, how did it impact your operations? (Check all that apply).</i> | |
|--|--------|
| We've spoken to our neighbors | 32.23% |
| We've had to create a buffer zone on our own land | 27.96% |
| Our crops were damaged as a result of the drift | 14.69% |
| Other | 14.69% |
| Our crop yields decreased as a result of the drift | 14.22% |
| We filed a complaint with local agricultural authorities/reported it to them | 6.64% |
| We've decided to change what specialty crops we grow next season | 6.16% |
| We're considering using Dicamba-resistant seeds as a result | 5.69% |
| We discovered our insurance will not cover Dicamba drift or damage | 5.69% |
| We are pursuing or have pursued legal options | 2.84% |
| We have started using Dicamba-resistant seeds | 1.90% |
| We have decided not to farm next season, due to the high likelihood of Dicamba drift and damage. | 0.95% |
| We received compensation for the damage to our crops | 0.00% |

In addition, 7.6 percent of all conventional (seed crop and vegetable) farmers say concerns about pesticide drift are a top three factor in their seed purchasing decisions, and 9.1 percent of conventional grain crop farmers report it as a top three factor.

Switching to Organic

Likely to Switch to Organic:

Of conventional farmer respondents, 28.8 percent indicate they are likely to transition to organic farming.

For them, the decision to switch is driven by two strong positive considerations but is inhibited by one countervailing factor:

- Customer demand for organic is very strong – 84.0 percent
- Organic products get higher prices – 81.0 percent
- The contamination risk from nearby non-organic operations is too high – 51.4 percent

Unlikely to Switch:

For the remaining 71.2 percent who indicate they are not transitioning to organic, the top factors why are:

- Organic practices are too complicated – 63.8 percent
- The contamination risk from nearby non-organic operations is too high – 47.0 percent
- Organic products will not reliably produce enough income for our operation – 44.0 percent

— *Victoria Bassetti*
March 6, 2018
Prepared for Friends of the Earth and SumOfUs

SELECT RESPONSES BY SEGMENTS

Table 4 : Breakdown of Respondents

| Number of Respondents in Segment | |
|----------------------------------|-----|
| All | 957 |
| Conventional | 533 |
| Conventional field crop only | 173 |
| Conventional vegetable only | 283 |
| Organic | 375 |
| Organic field crop only | 48 |
| Organic vegetable only | 219 |

Table 5: Key Price and Quality Issues

| Thinking about the following statements, please indicate whether you agree or disagree.* | All Respondents | | | Conventional Vegetable Farmers | | |
|---|------------------------------------|---------|--|------------------------------------|---------|--|
| | Top Two (Strongly/ Somewhat Agree) | Neutral | Bottom Two (Strongly/ Somewhat Disagree) | Top Two (Strongly/ Somewhat Agree) | Neutral | Bottom Two (Strongly/ Somewhat Disagree) |
| Regionally adapted seed varieties are critical given increasing climate variability | 81.5% | 16.7% | 1.8% | 79.2% | 16.7% | 2.1% |
| We've been paying steadily higher prices for seeds in the last 5 years | 80.2% | 17.2% | 2.6% | 67.4% | 17.2% | 0.0% |
| The increased productivity offered by new seed varieties has NOT offset their higher prices | 63.9% | 30.7% | 5.5% | 47.8% | 30.7% | 4.4% |
| In the last 5 years, we've had less bargaining power for seeds and chemicals | 64.8% | 32.7% | 2.5% | 46.5% | 32.7% | 2.3% |
| We have fewer seed variety options than 5 years ago | 60.7% | 27.3% | 12.0% | 48.9% | 27.3% | 14.9% |
| We've been paying steadily higher prices for herbicides and pesticides in the last 5 years | 45.8% | 50.3% | 3.9% | 33.3% | 50.3% | 2.2% |
| Because of weed resistance, we have to spend more on herbicide chemicals | 30.9% | 48.3% | 20.8% | 19.0% | 48.3% | 23.8% |

| | | |
|-----------------------|-----|----|
| Number of respondents | 234 | 52 |
|-----------------------|-----|----|

| Thinking about the following statements, please indicate whether you agree or disagree.* | Conventional Field Crop Farmers | | | Organic Farmers | | |
|---|------------------------------------|---------|--|------------------------------------|---------|--|
| | Top Two (Strongly/ Somewhat Agree) | Neutral | Bottom Two (Strongly/ Somewhat Disagree) | Top Two (Strongly/ Somewhat Agree) | Neutral | Bottom Two (Strongly/ Somewhat Disagree) |
| Regionally adapted seed varieties are critical given increasing climate variability | 77.8% | 16.7% | 2.2% | 85.5% | 16.7% | 0.9% |
| We've been paying steadily higher prices for seeds in the last 5 years | 84.8% | 17.2% | 8.7% | 64.3% | 17.2% | 2.0% |
| The increased productivity offered by new seed varieties has NOT offset their higher prices | 76.1% | 30.7% | 8.7% | 82.8% | 30.7% | 1.7% |
| In the last 5 years, we've had less bargaining power for seeds and chemicals | 81.4% | 32.7% | 4.7% | 67.3% | 32.7% | 8.4% |
| We have fewer seed variety options than 5 years ago | 54.3% | 27.3% | 17.4% | 63.2% | 27.3% | 5.3% |
| We've been paying steadily higher prices for herbicides and pesticides in the last 5 years | 82.2% | 50.3% | 6.7% | 29.3% | 50.3% | 4.0% |
| Because of weed resistance, we have to spend more on herbicide chemicals | 72.7% | 48.3% | 9.1% | 7.8% | 48.3% | 27.3% |

| | | |
|-----------------------|----|-----|
| Number of respondents | 46 | 118 |
|-----------------------|----|-----|

* Answer options were randomized

Table 6: Seed Purchase Factors

| Thinking about your seed purchasing orders, pick the three most important factors in your decisionmaking* | All Conventional Farmers | | Conventional Vegetable Farmers | | Conventional Field Crop Farmers | | Organic Farmers | |
|---|--------------------------|------|--------------------------------|------|---------------------------------|------|-----------------|------|
| | % Response | Rank | % Response | Rank | % Response | Rank | % Response | Rank |
| Geography/local climate | 45.2% | 1 | 53.0% | 1 | 34.4% | 6 | 50.0% | 2 |
| Previous experience with the variety | 42.5% | 2 | 38.4% | 2 | 41.6% | 2 | 43.6% | 3 |
| Price | 42.0% | 3 | 30.8% | 5 | 58.4% | 1 | 17.0% | 8 |
| Tolerance traits | 33.4% | 4 | 30.3% | 6 | 39.0% | 3 | 27.3% | 5 |
| Appropriateness to soil type | 32.7% | 5 | 31.9% | 4 | 36.4% | 4 | 20.3% | 7 |
| Time to maturity | 28.8% | 6 | 20.5% | 8 | 36.4% | 5 | 22.7% | 6 |
| Availability | 22.4% | 7 | 21.1% | 7 | 25.3% | 7 | 27.6% | 4 |
| Organic | 21.4% | 8 | 35.1% | 3 | 7.1% | 9 | 75.5% | 1 |
| Other | 11.8% | 9 | 15.1% | 9 | 4.6% | 10 | 11.2% | 9 |
| Pesticide drift concerns | 7.6% | 10 | 8.1% | 10 | 9.1% | 8 | 5.5% | 10 |
| Number of respondents | 407 | | 185 | | 154 | | 330 | |

Table 7: Experience with Price Discounts or Rebates

| Have you been offered seed price discounts or rebates for the following: (Check all that apply).* | All Respondents | Conventional Vegetable Farmers | Conventional Field Crop Farmers | Organic Farmers |
|---|-----------------|--------------------------------|---------------------------------|-----------------|
| Volume or bulk purchase | 58.5% | 50.4% | 61.5% | 60.2% |
| Early purchase | 51.3% | 33.1% | 68.9% | 50.0% |
| Paying cash ahead of delivery | 32.4% | 17.4% | 56.6% | 23.9% |
| Long-time customer | 18.6% | 10.7% | 27.9% | 18.1% |
| Other (open ended) | 14.0% | 22.3% | 9.0% | 13.7% |
| Bundle with seeds for other crops | 9.5% | 3.3% | 17.2% | 8.4% |
| Bundle with chemicals | 8.9% | 6.6% | 17.2% | 4.4% |
| Using financing provided by the seed manufacturer | 8.7% | 2.5% | 23.0% | 3.1% |
| Multi-year commitment | 3.9% | 2.5% | 9.8% | 2.2% |
| Number of respondents | 515 | 122 | 121 | 226 |

* Answer options were randomized

Table 8: Other Seed Purchase Experiences

| <i>In the last five years, when you placed a seed order, did you experience any of the following? (Check all that apply).*</i> | <i>All Respondents</i> | <i>Conventional Vegetable Farmers</i> | <i>Conventional Field Crop Farmers</i> | <i>Organic Farmers</i> |
|--|------------------------|---------------------------------------|--|------------------------|
| available | 20.6% | 14.1% | 16.0% | 28.2% |
| Because we needed to have a particular trait, we had very restricted options | 14.6% | 10.2% | 8.3% | 19.9% |
| We had to accept seed traits we did not want or need | 12.5% | 9.0% | 20.1% | 10.4% |
| We were offered a lower price (including discounts or rebates) if we also bought pesticides, herbicides, or other chemicals from the same manufacturer | 10.5% | 6.2% | 22.2% | 5.4% |
| Other (open ended) | 7.0% | 9.6% | 3.5% | 6.3% |
| We were offered the seed in combination with a pesticide or herbicide application/spraying service | 3.9% | 2.8% | 7.6% | 2.2% |
| We had to delay a seed order while we waited for an operating loan to come through | 3.7% | 1.1% | 5.6% | 4.1% |
| We could only buy the seed in a bundle with pesticides, herbicides, or other chemicals from the same manufacturer | 3.6% | 4.0% | 7.6% | 1.0% |
| We were offered a yield guarantee if we used the seed in combination with pesticides, herbicides, or other chemicals from | 2.9% | 3.4% | 4.9% | 1.9% |
| Our insurance policy affected the types of seeds we could buy | 0.6% | 0.0% | 2.1% | 0.3% |
| None of the above | 57.0% | 65.5% | 53.5% | 54.1% |
| Number of respondents | 698 | 177 | 144 | 316 |

Table 9: Seed Genetics

| <i>Thinking about the seed lines available to your operation, would you say that in the last 10 years that seed genetics for</i> | <i>All Respondents</i> | <i>Conventional Vegetable</i> | <i>Conventional Field Crop</i> | <i>Organic Farmers</i> |
|--|------------------------|-------------------------------|--------------------------------|------------------------|
| Significantly diminishing | 21.8% | 17.9% | 12.5% | 27.2% |
| Somewhat diminishing | 25.6% | 27.2% | 19.7% | 29.1% |
| About the same | 22.3% | 26.6% | 21.7% | 21.6% |
| Somewhat expanding | 22.3% | 22.0% | 33.6% | 16.9% |
| Significantly expanding | 8.0% | 6.4% | 12.5% | 5.3% |
| Number of respondents | 712 | 173 | 152 | 320 |

* Answer options were randomized

Table 10: Farming Practices to Compensate for Weed Resistance

| <i>Thinking about weed resistance to synthetic herbicides, which of the following techniques are you using to manage weeds. (Check all that apply).*</i> | <i>All Conventional Respondents</i> | <i>Conventional Vegetable Farmers</i> | <i>Conventional Field Crop Farmers</i> | <i>Organic Farmers</i> |
|--|-------------------------------------|---------------------------------------|--|------------------------|
| We use cover crops | 42.3% | 39.0% | 42.0% | NA |
| We use tillage as a weed management tool | 35.3% | 34.6% | 33.6% | NA |
| We apply herbicides with multiple modes of action | 27.4% | 7.6% | 50.4% | NA |
| We rotate herbicide usage | 24.2% | 8.2% | 38.9% | NA |
| We use more labor and equipment | 22.2% | 31.5% | 8.4% | NA |
| Does not apply. We're an organic operation | 16.0% | 24.5% | 2.3% | NA |
| We use hand-weeding in addition to herbicide application | 15.5% | 17.0% | 13.0% | NA |
| We buy new chemical formulations to combat weeds | 15.2% | 7.6% | 25.2% | NA |
| Other (open ended) | 14.6% | 21.4% | 7.6% | NA |
| We intend to cut back herbicide usage and rely on other techniques | 12.0% | 10.7% | 13.0% | NA |
| We rotate herbicide tolerance traits in seeds | 9.9% | 1.9% | 18.3% | NA |
| We use a cultivator in addition to herbicide application | 9.0% | 5.0% | 10.7% | NA |
| We use more herbicides | 6.7% | 2.5% | 12.2% | NA |
| Number of respondents | 343 | 159 | 131 | |

* Answer options were randomized

METHODOLOGY NOTE

The sample used for this survey was purposive. The respondents were recruited by farming group associations. The data and sample size are especially strong for organic farmers and for small family farmers.

Small family farmers and organic farmers are hard to survey using conventional polling techniques. This survey enabled us to quickly and efficiently explore certain issues and probe for information about specific farming practices.

There are several reasons why we think that this purposive sample offers valuable insight. First, the sample size is relatively large. Second, many of our questions were quantitative in nature. Third, our questions, by and large, were about farmer experience and practice which is something the respondents are directly engaged in.

**Results of February 2018 Seeds and Chemicals Survey of Farmers
(All Respondents Unless Otherwise Indicated)**

Q1: At which occupation did you spend the majority (50 percent or more) of your worktime in 2017?

Answered: 957

| ANSWER CHOICES | RESPONSES | |
|-------------------------------------|-----------|------------|
| Farm or ranch work | 70.64% | 676 |
| Work other than farming or ranching | 29.36% | 281 |
| TOTAL | | 957 |

Q2: Did you grow any of the specified field crops at your operation in 2017? (Check all that apply).

Answered: 917

| ANSWER CHOICES | RESPONSES | |
|--------------------------------|-----------|-----|
| Alfalfa seed | 2.84% | 26 |
| Barley | 4.14% | 38 |
| Canola, edible | 0.44% | 4 |
| Corn for grain or seed | 17.12% | 157 |
| Corn for silage or greenchop | 5.34% | 49 |
| Cotton, Pima | 0.33% | 3 |
| Cotton, Upland | 0.55% | 5 |
| Oats for grain or seed | 7.09% | 65 |
| Rice | 0.33% | 3 |
| Soybeans | 13.09% | 120 |
| Wheat | 12.43% | 114 |
| I did not grow any field crops | 55.40% | 508 |
| Other (please specify) | 23.77% | 218 |
| Total Respondents: 917 | | |

Q3: Did you grow any of the specified vegetables, sweet corn, potatoes, or melons at your operation in 2017? (Check all that apply).

Answered: 917

| ANSWER CHOICES | RESPONSES | |
|------------------------------------|-----------|-----|
| Beets | 30.53% | 280 |
| Beans | 34.02% | 312 |
| Broccoli | 25.63% | 235 |
| Canteloupe | 17.12% | 157 |
| Carrots | 30.32% | 278 |
| Corn, sweet | 16.79% | 154 |
| Lettuce | 33.91% | 311 |
| Onions | 33.70% | 309 |
| Peppers, bell | 32.28% | 296 |
| Peppers, hot | 30.10% | 276 |
| Potatoes | 28.35% | 260 |
| Spinach | 28.57% | 262 |
| Tomatoes, for fresh market | 35.99% | 330 |
| Tomatoes, for processing | 15.59% | 143 |
| I did not grow any vegetable crops | 47.22% | 433 |
| Other (please specify) | 21.81% | 200 |
| Total Respondents: 917 | | |

Q4: During 2017, did your operation produce organic products according to USDA's National Organic Program (NOP) standards or have acres transitioning into USDA NOP production? Exclude processing and handling.

Answered: 907

| ANSWER CHOICES | RESPONSES | |
|------------------------|-----------|-----|
| Yes | 41.35% | 375 |
| No | 58.77% | 533 |
| Total Respondents: 907 | | |

Q5: Have you considered producing organic products in your operation?
(For respondents who answered No to Question 4)

Answered: 495

| ANSWER CHOICES | RESPONSES | |
|---|------------------|------------|
| Yes, but we probably will not | 37.17% | 184 |
| Yes, and we probably will transition to organic | 29.09% | 144 |
| No | 33.74% | 167 |
| TOTAL | | 495 |

Q6: Please indicate whether the following factors are influencing your decision whether to adopt organic production. (For respondents who answered No to Question 4)

Answered: 485

| | STRONGLY AGREE | SOMEWHAT AGREE | NEUTRAL | SOMEWHAT DISAGREE | STRONGLY DISAGREE | TOTAL |
|--|----------------|----------------|---------------|-------------------|-------------------|-------|
| Organic farming is too expensive | 15.69% 75 | 28.03% 134 | 28.45% 136 | 14.23% 68 | 13.60% 65 | 478 |
| Other practices required for organic certification are too complicated for our operation | 27.25% 130 | 32.70% 156 | 24.95% 119 | 9.64% 46 | 5.45% 26 | 477 |
| Organic seed is not reliably available | 9.75% 46 | 17.80% 84 | 41.53% 196 | 15.04% 71 | 15.89% 75 | 472 |
| Organic products will not reliably produce enough income for our operation | 17.78% 85 | 18.41% 88 | 30.13% 144 | 16.11% 77 | 17.57% 84 | 478 |
| The contamination risk from nearby non-organic operations is too high | 26.56% 128 | 21.58% 104 | 30.91% 149 | 10.37% 50 | 10.58% 51 | 482 |
| Our customers do not want organic produce | 7.97% 38 | 10.06% 48 | 34.59% 165 | 16.98% 81 | 30.40% 145 | 477 |
| Our operation is too big to switch to organic | 4.42% 21 | 8.42% 40 | 36.21% 172 | 14.32% 68 | 36.63% 174 | 475 |
| Other family members (2nd generation) are motivated to transition | 6.98% 33 | 12.26% 58 | 57.29% 271 | 8.25% 39 | 15.22% 72 | 473 |
| Customer demand for organic is very strong | 26.40% 127 | 24.74% 119 | 27.65% 133 | 9.98% 48 | 11.23% 54 | 481 |
| We'll get higher prices for organic products | 25.05% 119 | 32.00% 152 | 25.47% 121 | 8.42% 40 | 9.05% 43 | 475 |
| We want to transition from corporate farming | 10.83% 51 | 9.55% 45 | 57.75% 272 | 6.16% 29 | 15.71% 74 | 471 |

Q7: How concerned are you that agrochemical (e.g. pesticides or herbicides) drift will impact your certification or ability to continue organic farming? (Pick one). *(For respondents who answered Yes to Question 4)*

Answered: 359

| ANSWER CHOICES | RESPONSES | |
|--------------------|-----------|-----|
| Very concerned | 69.64% | 250 |
| Somewhat concerned | 20.61% | 74 |
| Neutral | 3.06% | 11 |
| Not concerned | 6.69% | 24 |
| TOTAL | | 359 |

Q8: How concerned are you that GMO pollen drift will impact your certification or ability to continue organic farming? (Pick one). *(For respondents who answered Yes to Question 4)*

Answered: 358

| ANSWER CHOICES | RESPONSES | |
|--------------------|-----------|-----|
| Very concerned | 64.25% | 230 |
| Somewhat concerned | 21.79% | 78 |
| Neutral | 6.42% | 23 |
| Not concerned | 7.54% | 27 |
| TOTAL | | 358 |

Q9: Have any of the following ever happened to your operation as a result of agrochemical drift or another contamination factor out of your control? (Check all that apply). (For respondents who answered Yes to Question 4)

Answered: 159

| ANSWER CHOICES | RESPONSES | |
|---|-----------|----|
| We lost our certification (in whole or in part) | 3.77% | 6 |
| We opted not to sell some our products as a result of drift | 18.87% | 30 |
| We had to sell some of our products as non-organic | 20.75% | 33 |
| We were not permitted to sell our products for food consumption | 5.66% | 9 |
| Other: | 60.38% | 96 |
| Total Respondents: 159 | | |

Q10: What practices have you undertaken to prevent drift or other forms of contamination? (Check all that apply). (For respondents who answered Yes to Question 4)

Answered: 289

| ANSWER CHOICES | RESPONSES | |
|---|-----------|-----|
| We've created a buffer zone or barrier on our own land | 68.86% | 199 |
| We've spoken to our neighbors | 58.48% | 169 |
| We're considering giving up our organic certification | 3.11% | 9 |
| We filed a complaint with local agricultural authorities/reported it to them | 9.00% | 26 |
| We are pursuing or have pursued legal options | 4.50% | 13 |
| Some of our operations are now non-organic | 5.54% | 16 |
| We plant different varieties to prevent cross-pollination (GMO contamination) | 27.34% | 79 |
| Total Respondents: 289 | | |

Q11: In general, how far in advance of planting do you place your order for the seeds you intend to use for your most important crop?

Answered: 745

| ANSWER CHOICES | RESPONSES | |
|------------------------|-----------|------------|
| 1-2 weeks | 4.83% | 36 |
| 2 weeks-1 month | 11.81% | 88 |
| 1-3 months | 38.66% | 288 |
| 3-6 months | 30.07% | 224 |
| 7+ months | 3.76% | 28 |
| Other (please specify) | 10.87% | 81 |
| TOTAL | | 745 |

Q12: Thinking about the seed lines available to your operation, would you say that in the last 10 years that seed genetics for breeding are:

Answered: 712

| ANSWER CHOICES | RESPONSES | |
|---------------------------|-----------|------------|
| Significantly diminishing | 21.77% | 155 |
| Somewhat diminishing | 25.56% | 182 |
| About the same | 22.33% | 159 |
| Somewhat expanding | 22.33% | 159 |
| Significantly expanding | 8.01% | 57 |
| TOTAL | | 712 |

Q13: Thinking about your seed purchasing orders, pick the three most important factors in your decisionmaking.

Answered: 740

| ANSWER CHOICES | RESPONSES |
|---|------------|
| Time to maturity | 26.08% 193 |
| Appropriateness to soil type | 27.03% 200 |
| Geography/local climate | 47.43% 351 |
| Tolerance traits | 30.68% 227 |
| Price | 30.81% 228 |
| Availability | 24.73% 183 |
| We're concerned about pesticide drift from other operations so have to buy seed with that in mind | 6.62% 49 |
| Previous experience with the variety | 42.97% 318 |
| Organic | 45.68% 338 |
| Other (please specify) | 11.49% 85 |
| Total Respondents: 740 | |

Q14: In the last five years, when you placed a seed order, did you experience any of the following? (Check all that apply).

Answered: 698

| ANSWER CHOICES | RESPONSES | |
|--|------------------|-----|
| We were offered a lower price (including discounts or rebates) if we also bought pesticides, herbicides, or other chemicals from the same manufacturer | 10.46% | 73 |
| We were offered a yield guarantee if we used the seed in combination with pesticides, herbicides, or other chemicals from the same manufacturer | 2.87% | 20 |
| We could only buy the seed in a bundle with pesticides, herbicides, or other chemicals from the same manufacturer | 3.58% | 25 |
| We had to delay a seed order while we waited for an operating loan to come through | 3.72% | 26 |
| We had to accept seed traits we did not want or need | 12.46% | 87 |
| Our insurance policy affected the types of seeds we could buy | 0.57% | 4 |
| Because we needed to have a particular trait, we had very restricted options | 14.61% | 102 |
| The seed variety and trait combinations we wanted were not available | 20.63% | 144 |
| We were offered the seed in combination with a pesticide or herbicide application/spraying service | 3.87% | 27 |
| None of the above | 57.02% | 398 |
| Other (please specify) | 7.02% | 49 |
| Total Respondents: 698 | | |

Q15: Have you been offered seed price discounts or rebates for the following: (Check all that apply).

Answered: 515

| ANSWER CHOICES | RESPONSES | |
|---|-----------|-----|
| Long-time customer | 18.64% | 96 |
| Early purchase | 51.26% | 264 |
| Volume or bulk purchase | 58.45% | 301 |
| Multi-year commitment | 3.88% | 20 |
| Bundle with chemicals | 8.93% | 46 |
| Bundle with seeds for other crops | 9.51% | 49 |
| Paying cash ahead of delivery | 32.43% | 167 |
| Using financing provided by the seed manufacturer | 8.74% | 45 |
| Other (please specify) | 13.98% | 72 |
| Total Respondents: 515 | | |

Q16: How many retail source or distributor options do you have for your seed purchases?

Answered: 633

| ANSWER CHOICES | RESPONSES | |
|----------------|-----------|-----|
| 1 | 5.37% | 34 |
| 2 | 15.64% | 99 |
| 3 | 29.07% | 184 |
| 4 | 15.17% | 96 |
| 5 | 6.95% | 44 |
| 6+ | 27.80% | 176 |
| TOTAL | | 633 |

Q17: In the last 5 years, have any of your seed retail sources or distributors switched to offering seed from only one manufacturer?

Answered: 618

| ANSWER CHOICES | RESPONSES | |
|----------------|-----------|-----|
| Yes | 31.39% | 194 |
| No | 68.61% | 424 |
| TOTAL | | 618 |

Q18: How many retail source or distributor options do you have for your pesticide purchases?

Answered: 470

| ANSWER CHOICES | RESPONSES | |
|----------------|-----------|-----|
| 1 | 14.26% | 67 |
| 2 | 25.74% | 121 |
| 3 | 23.40% | 110 |
| 4 | 10.43% | 49 |
| 5 | 4.89% | 23 |
| 6+ | 21.28% | 100 |
| TOTAL | | 470 |

Q19: How many retail source or distributor options do you have for your herbicide purchases?

Answered: 448

| ANSWER CHOICES | RESPONSES | |
|-----------------------|------------------|------------|
| 1 | 14.51% | 65 |
| 2 | 26.12% | 117 |
| 3 | 22.10% | 99 |
| 4 | 10.71% | 48 |
| 5 | 4.02% | 18 |
| 6+ | 22.54% | 101 |
| TOTAL | | 448 |

Q20: Thinking about weed resistance to synthetic herbicides, which of the following techniques are you using to manage weeds. (Check all that apply).

Answered: 647

| ANSWER CHOICES | RESPONSES | |
|--|-----------|-----|
| We buy new chemical formulations to combat weeds | 8.04% | 52 |
| We rotate herbicide usage | 13.29% | 86 |
| We rotate herbicide tolerance traits in seeds | 5.72% | 37 |
| We apply herbicides with multiple modes of action | 15.30% | 99 |
| We use tillage as a weed management tool | 36.63% | 237 |
| We use more labor and equipment | 24.88% | 161 |
| We use cover crops | 47.14% | 305 |
| We intend to cut back herbicide usage and rely on other techniques | 6.96% | 45 |
| We use a cultivator in addition to herbicide application | 5.41% | 35 |
| We use hand-weeding in addition to herbicide application | 11.13% | 72 |
| Does not apply. We're an organic operation | 47.91% | 310 |
| We use more herbicides | 3.86% | 25 |
| Other (please specify) | 12.83% | 83 |
| Total Respondents: 647 | | |

Q21: Did your farming operation experience or receive Dicamba drift at any time in the last 3 years?

Answered: 654

| ANSWER CHOICES | RESPONSES | |
|---|-----------|-----|
| Yes | 5.96% | 39 |
| No | 62.08% | 406 |
| No, but I am concerned our operations are at risk | 33.03% | 216 |
| Total Respondents: 654 | | |

Q22: If you experienced or recieved Dicamba drift or believe you are at risk of it, how did it impact your operations? (Check all that apply).

Answered: 211

| ANSWER CHOICES | RESPONSES | |
|--|------------------|----|
| We're considering using Dicamba-resistant seeds as a result | 5.69% | 12 |
| We have started using Dicamba-resistant seeds | 1.90% | 4 |
| Our crop yields decreased as a result of the drift | 14.22% | 30 |
| We filed a complaint with local agricultural authorities/reported it to them | 6.64% | 14 |
| Our crops were damaged as a result of the drift | 14.69% | 31 |
| We are pursuing or have pursued legal options | 2.84% | 6 |
| We received compensation for the damage to our crops | 0.00% | 0 |
| We've had to create a buffer zone on our own land | 27.96% | 59 |
| We've spoken to our neighbors | 32.23% | 68 |
| We discovered our insurance will not cover Dicamba drift or damage | 5.69% | 12 |
| We've decided to change what specialty crops we grow next season | 6.16% | 13 |
| We have decided not to farm next season, due to the high likelihood of Dicamba drift and damage. | 0.95% | 2 |
| No impact | 31.75% | 67 |
| Other (please specify) | 14.69% | 31 |
| Total Respondents: 211 | | |

Q23: Thinking about the following statements, please indicate whether you agree or disagree.

Answered: 234

| | STRONGLY AGREE | SOMEWHAT AGREE | NEUTRAL | SOMEWHAT DISAGREE | STRONGLY DISAGREE | TOTAL |
|---|----------------|----------------|--------------|-------------------|-------------------|-------|
| We've been paying steadily higher prices for seeds in the last 5 years | 41.85% 95 | 38.33% 87 | 17.18% 39 | 2.20% 5 | 0.44% 1 | 227 |
| We've been paying steadily higher prices for herbicides and pesticides in the last 5 years | 25.70% 46 | 20.11% 36 | 50.28% 90 | 0.56% 1 | 3.35% 6 | 179 |
| The increased productivity offered by new seed varieties has NOT offset their higher prices | 39.11% 79 | 24.75% 50 | 30.69% 62 | 4.95% 10 | 0.50% 1 | 202 |
| We have fewer seed variety options than 5 years ago | 34.72% 75 | 25.93% 56 | 27.31% 59 | 8.33% 18 | 3.70% 8 | 216 |
| Regionally adapted seed varieties are critical given increasing climate variability | 58.37% 129 | 23.08% 51 | 16.74% 37 | 0.90% 2 | 0.90% 2 | 221 |
| In the last 5 years, we've had less bargaining power for seeds and chemicals | 37.69% 75 | 27.14% 54 | 32.66% 65 | 2.01% 4 | 0.50% 1 | 199 |
| Because of weed resistance, we have to spend more on herbicide chemicals | 21.35% 38 | 9.55% 17 | 48.31% 86 | 3.37% 6 | 17.42% 31 | 178 |

Q24: In the last year, four major seed and chemical businesses have merged: Dow with Dupont and Syngenta with ChemChina. One other merger, between Bayer and Monsanto, is still pending. A merged Bayer-Monsanto would be the world's largest seed and chemical company. How concerned are you about the proposed Bayer-Monsanto merger?

Answered: 647

| ANSWER CHOICES | RESPONSES | |
|--------------------|-----------|-----|
| Very concerned | 82.84% | 536 |
| Somewhat concerned | 10.82% | 70 |
| Neutral | 2.47% | 16 |
| Not concerned | 3.55% | 23 |
| Not sure | 0.31% | 2 |
| TOTAL | | 647 |

Q25: How concerned are you that the proposed merger of Monsanto and Bayer would result in harm to independent farmers and farming communities?

Answered: 650

| ANSWER CHOICES | RESPONSES | |
|--------------------|-----------|-----|
| Very concerned | 83.85% | 545 |
| Somewhat concerned | 9.85% | 64 |
| Neutral | 1.85% | 12 |
| Not concerned | 3.69% | 24 |
| Not sure | 0.77% | 5 |
| TOTAL | | 650 |

Q26: Thinking about the proposed merger of Monsanto and Bayer, how concerned are you about:

Answered: 640

| | VERY CONCERNED | SOMEWHAT CONCERNED | NOT CONCERNED | NOT SURE | TOTAL | WEIGHTED AVERAGE |
|--|----------------|--------------------|---------------|--------------|-------|------------------|
| Paying more for seeds | 58.74% 363 | 20.23% 125 | 15.21% 94 | 5.83% 36 | 618 | 1.68 |
| Paying more for chemicals | 42.33% 240 | 13.76% 78 | 33.16% 188 | 10.76% 61 | 567 | 2.12 |
| Decreasing innovation in seeds and chemicals | 59.13% 353 | 20.94% 125 | 14.24% 85 | 5.70% 34 | 597 | 1.66 |
| Fewer seed varieties will be produced and/or commercially available | 69.84% 433 | 18.87% 117 | 8.06% 50 | 3.23% 20 | 620 | 1.45 |
| Increasing pressure for chemically dependent farming | 77.08% 481 | 11.86% 74 | 9.13% 57 | 1.92% 12 | 624 | 1.36 |
| The company using its dominance in one product to push sales of other products | 79.59% 499 | 12.28% 77 | 5.90% 37 | 2.23% 14 | 627 | 1.31 |
| The company controlling data about farm practices | 79.52% 501 | 12.22% 77 | 6.03% 38 | 2.22% 14 | 630 | 1.31 |

Methodological Notes

- Survey results are based on an online poll conducted from January 26 to February 12, 2018.
- Respondents were recruited by the following farming groups: Agricultural Justice Project, California Farmers Guild, Center for Rural Affairs, City Seed, Community Alliance with Family Farmers, Domestic Fair Trade Association, Farmworker Association of Florida, Family Farm Defenders, Farm Aid, Farm and Ranch Freedom Alliance, Farmworker Association of Florida, Florida Organic Growers, Friends of Family Farmers, Hawai'i Farmers Union United, Hawai'i Tropical Fruit Growers, Iowa Farmers Union, International Federation of Organic Agriculture Movements, Kansas Rural Center, Maine Organic Farmers and Gardeners Association, Minnesota Farmers Union, Missouri Coalition for the Environment, National Family Farm Coalition, National Farmers Union, National Latino Farmers and Ranchers Trade Association, Natural Born Tillers, New Britain ROOTS, Northeast Organic Dairy Producers Alliance, Northeast Organic Farming Association of Connecticut, Northeast Organic Farming Association of Massachusetts, Organic Farmers Association, Organic Farming Research Foundation, Organic Seed Alliance, Organic Seed Growers and Trade Association, Organization for Competitive Markets, Our Family Farms, Pesticide Action Network North America, Practical Farmers of Iowa, Ranchers-Cattlemen Action Legal Fund, United Stockgrowers of America, Rural Coalition, Rural Vermont, Sustainable Food Center, Texas Organic Farmers and Gardeners Association, The Cornucopia Institute, Vilicus Farms, and the Women Food and Agriculture Network.
- Only respondents who reported operating a farm and producing either grain or vegetable crops were included in the final survey results.
- Due to rounding, percentages may not total 100%. The topline "total" columns show 100%.
- Not all questions are presented in this topline report.