

THE ANTICOMPETITIVE IMPACT OF THE PROPOSED BAYER-MONSANTO MERGER ON VEGETABLE SEED MARKETS

Andrew Finch
Acting Assistant Attorney General
U.S. Department of Justice Antitrust Division
950 Pennsylvania Avenue, N.W.
Washington, D.C. 20530

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Re: The Proposed Bayer-Monsanto Merger and Vegetable Seeds

BY POST AND ELECTRONIC MAIL: antitrust.atr@usdoj.gov

Dear Acting Assistant Attorney General Finch:

The 24 undersigned advocacy organizations representing farmers, consumers and rural communities respectfully urge the U.S. Department of Justice to block the proposed merger between Bayer AG (Bayer) and the Monsanto Company (Monsanto).

The proposed \$66 billion Bayer-Monsanto deal would create the world's biggest agrochemical and seed company — eclipsing the Dow Chemical-DuPont and Syngenta-ChemChina deals completed over the past two years.¹ The completion of the three seed mega-mergers would make these top three seed and agribusiness firms three times larger than the rest of the top 10 global competitors combined.²

This deal has drawn most attention for the combination of agrochemicals and patented genetically modified (GM) commodity crop seeds, but the two companies are both significant players in vegetable seeds as well. Monsanto and Bayer are the first and fourth largest vegetable seed producers in the world, respectively.³

The vegetable seed industry is already highly consolidated. The proposed merger would strengthen the market power of the largest firm, disadvantage rival seed companies and increase the prices farmers pay for vegetable seeds while reducing their planting options — resulting in higher prices and reduced choices that are passed onto consumers at the supermarket.

Furthermore, the merger joins companies that dominate not only vegetable seeds but also the pesticides and herbicides that vegetable farmers use. Bayer and Monsanto were the second and fifth largest agrichemical suppliers in 2015 with combined pesticide and herbicide sales of \$14.3 billion.⁴

¹ Burger, Ludwig and Georgina Prodhon. “Bayer defies critics with \$62 billion Monsanto offer.” *Reuters*. May 23, 2016; “Bayer confirms \$66bn Monsanto takeover.” *British Broadcasting Corporation*. September 14, 2016.

² Zhang, Jason. “Summary and analysis of mergers between global seed companies in 2016.” *Agropages*. April 2017 at 14.

³ Vilmorin & Cie. “Annual Report 2015-2016.” 2016 at 21.

⁴ MacDonald, James M. “Mergers and Competition in Seed and Agricultural Chemical Markets.” United States Department of Agriculture. Economic Research Service. April, 2017.

Commercial vegetable cultivation requires high cost seed and agrichemical inputs.⁵ The proposed merger augments the potential leverage Bayer-Monsanto could have over farmers who need to buy both seeds and agrichemicals from a diminishing number of firms, making them vulnerable to loyalty agreements and cross-marketing tie-ins.⁶

Allowing Bayer and Monsanto to merge would harm vegetable farmers and extract value from a substantial agricultural and food market. There are more than 72,000 U.S. vegetable farms with over \$16.8 billion in farmgate vegetable and melon sales in 2012.⁷ Consumers spent about \$123 billion in the supermarket for fresh, frozen and canned produce that year.⁸ The proposed combination would create a firm with the market power to unilaterally impose price increases on vegetable seeds, threatening the economic viability of farmers and raising the prices consumers pay for vegetables. The Department of Justice should enjoin the proposed Bayer-Monsanto merger.

I. The proposed merger exacerbates consolidation in vegetable seed industry

The proposed merger will only further consolidate an already significantly concentrated vegetable seed industry. During the past three decades, seed mergers have substantially consolidated the global vegetable seed industry.⁹ The biggest deals created vegetable seed companies that combined plant breeding, seed production and marketing.¹⁰ According to researchers from the University College London Laws, “concentration of the seed industry is remarkable even considering traditionally high food sector concentration.”¹¹

Monsanto has aggressively pursued a merger strategy that diversified both its seed portfolio and geographic markets.¹² From 1995 to 2015, Monsanto purchased 19 seed companies — about two-thirds of the company’s takeovers.¹³ This has included vegetable seed lines and brands. In 2005, Monsanto bought vegetable seed company Seminis for over \$1 billion.¹⁴ The Seminis deal gave Monsanto control of 39 percent of the U.S. vegetable seed market and 26 percent of the global market.¹⁵ In 2008, it added the \$800 million purchase of De Ruiter Seeds that specialized in greenhouse vegetable seeds.¹⁶

⁵ Dias, João Silva and Edward J. Ryder. “World Vegetable Industry: Production, Breeding, Trends.” *Horticultural Reviews*. Vol. 38. 2011 at 319.

⁶ Howard, Phillip. “Intellectual Property and Consolidation in the Seed Industry.” *Crop Science*. Volume 55. December 2015 at 5.

⁷ U.S. Department of Agriculture (USDA). National Agricultural Statistical Service (NASS). 2012 Census of Agriculture. May 2014 at Table 65 at 92.

⁸ “Produce’s fresh outlook.” *Grocery Headquarters*. April 1, 2013; Major, Meg and Jim Dudicek. “Swirling fortunes.” *Progressive Grocer*. April 2013 at 48; IBISWorld. [Press release]. “Canned Fruit and Vegetable Processing in the US industry market research report from IBISWorld has been updated.” April 19, 2014.

⁹ Liu, Zhen et al. “The sectoral innovation system of the Dutch vegetable breeding industry.” *Wageningen Journal of Life Sciences*. Vol. 74-75. 2015 at 27.

¹⁰ Moretti, Irene Musselli. United Nations Conference on Trade and Development. “Tracking the Trend Towards Market Concentration: The Case of the Agricultural Input Industry. UNCTAD/DITC/COM/2005/16. April 20, 2006 at 7.

¹¹ Lianos, Ioannis et al. University College London Laws. “The Global Seed Market, Competition Law and Intellectual Property Rights: Untying the Gordian Knot.” Research Paper 2-2016. February 2016 at 19.

¹² Fuglie, Keith O. et al. USDA. Economic Research Service (ERS). “Research Investment and Market Structure in the Food Processing, Agricultural Input and Biofuel Industries Worldwide.” ERR-No. 130. December 2011 at 34.

¹³ Lianos et al. (2016) at 15.

¹⁴ Pollack, Andrew. “Monsanto buying leader in fruit and vegetable seeds.” *New York Times*. January 25, 2005.

¹⁵ Howard, Philip H. “Visualizing consolidation in the global seed industry: 1996-2008.” *Sustainability*. December 8, 2009 at 1276.

¹⁶ Tomich, Jeffrey. “Seeds grow Monsanto’s business.” *St. Louis Post-Dispatch*. September 20, 2009.

Other vegetable seed companies have grown through mergers as well. Vilmorin, the second largest global vegetable seed company, purchased 13 vegetable seed companies between 2008 and 2016, including seven U.S. vegetable seed companies such as Shamrock Seeds.¹⁷ Syngenta bought the vegetable lines from Aventa in 2006 and two U.S. lettuce seed companies in 2009 (Synergene Seed and Pybas Vegetable Seed Co.).¹⁸

Monsanto's Seminis vegetable seeds includes the De Ruiter, Asgrow, Petoseed and Royal Sluis seed brands.¹⁹ Bayer essentially had no presence in the seed industry until its 2002 purchase of Aventis Crop Science which included the vegetable line Nunhems.²⁰ In 2015, Bayer had \$443 million in vegetable seed sales.²¹ In 2013, Monsanto's vegetable division generated \$821 million in sales.²² Even with lower crop prices, Monsanto had \$801 million in vegetable seed sales generating \$401 million in profits in 2016.²³

Today, the largest seed companies are vertically integrated firms that research and breed cultivar varieties, multiply and manufacture seeds and distribute and market seeds to farmers.²⁴ Only a few vegetable seed companies dominate the market for each commercial vegetable crop.²⁵ These companies are primarily interested in a relatively narrow set of high-value vegetables.²⁶ In 2016, the second largest vegetable seed firm, Vilmorin, stated that "the sector has become highly concentrated."²⁷

The high level of consolidation has disadvantaged rivals and the farmers that buy seeds. Consolidation can allow seed companies to "appropriate economic benefits" by using their market power to charge more for seeds.²⁸ Further, companies often shut down brands or seed lines after takeovers, limiting farmer choices.²⁹ Seed mergers have allowed large companies to direct networks of seed supplies through partnerships and cross licensing of seed cultivars and create potential bottlenecks that harm farmers and consumers.³⁰

The proposed deal would further increase consolidation in the seed industry and drive out smaller firms.³¹ It is harder for smaller firms and new entrants to compete against the consolidated vegetable seed industry. The research requirements to introduce new varieties require both substantial funding and a vast pool of genetic material with which to breed cultivars.³² Bigger companies can also impose loyalty discounts on distributors that carry fewer rival seed brands or other exclusive

¹⁷ Vilmorin & Cie (2016) at 10 to 11.

¹⁸ Syngenta International AG (Syngenta). "Our Industry 2016." 2016 at 91; Fuglie et al. (2011) at 35.

¹⁹ Pollack (2005); Monsanto Corporation. U.S. Securities and Exchange Commission (SEC). Form 10-K Fiscal Year Ending August 31, 2016 at 4.

²⁰ Fuglie et al. (2011) at 34; Bayer AG. "Annual Report 2016 Augmented Version." 2016 at 46.

²¹ Vilmorin & Cie (2016) at 36; 2015 Euros converted to U.S. dollars with U.S. Federal Reserve Board. "Foreign Exchange Rates—G.5A Annual." January 4, 2017.

²² Paynter, Ben. "Monsanto is going organic in a quest for the perfect veggie." *Wired*. January 14, 2014.

²³ Zhang (2017) at 14; Monsanto Corporation (2016) at 156.

²⁴ Lianos et al. (2016) at 3.

²⁵ Dias, João Carlos de Silva. "Guiding strategies for breeding vegetable cultivars." *Agricultural Sciences*. Vol. 5, No. 1. 2014 at 9.

²⁶ Dias and Ryder (2011) at 330.

²⁷ Vilmorin & Cie (2016) at 15.

²⁸ Fuglie et al. (2011) at 14.

²⁹ Schafer, Sara. "Players offer more choices from fewer brands." *Farm Journal*. July 27, 2012.

³⁰ Lianos et al. (2016) at 4; Liu et al. (2015) at 28.

³¹ Court, Emma. "How a Bayer-Monsanto merger will wind up costing you at the grocery store." *MarketWatch*. September 15, 2016.

³² Dias and Ryder (2011) at 301.

marketing deals.³³ According to the U.S. Department of Agriculture, the substantial consolidation in agricultural input industries like seeds through the mid-2000’s led to many firms exiting as the remaining firms got bigger through mergers and takeovers.³⁴

II. Proposed merger raises concentration level in vegetable seeds

The proposed merger will significantly increase concentration in the vegetable seed industry, giving Bayer-Monsanto the ability to unilaterally raise prices on vegetable seeds. The appropriate market for review is the national market for vegetable seeds as well as the national market for specific vegetable seeds. Available evidence suggests that the vegetable seed market is already considerably concentrated and that the proposed merger will substantially increase concentration.

Precise levels of vegetable seed concentration are difficult to assess.³⁵ There is considerably less data on vegetable seed sales than commodity crops, largely because vegetables are grown on a much smaller area than corn, soybeans, wheat and other row crops. In 2012, vegetable production comprised only about 1 percent of harvested cropland in the United States.³⁶ Further, this small area of cultivation is divided between dozens of different vegetable types, meaning that concentration is likely to be considerably higher in specific markets such as processing tomatoes.

The proposed merger joins the largest global vegetable seed company (Monsanto) with the fourth largest (Bayer).³⁷ In 2015, the four largest companies (Monsanto, Vilmorin, Syngenta and Bayer) controlled 71 percent of global vegetable seed sales (see Table 1) and Monsanto alone controlled 22 percent of the global market.³⁸ This high level of market concentration has held steady for about a decade. The top four firms controlled about 70 percent of the global vegetable seed market in 2007 and in 2013.³⁹ The high and steady level of global concentration warrants substantial scrutiny under the Department of Justice-Federal Trade Commission merger guidelines that “give more weight to market concentration when market shares have been stable over time.”⁴⁰

Table 1. Estimates of 2015 Global and U.S. Vegetable Seed Concentration

	Global Sales (\$M)	Market Share	Est. U.S. Sales (\$M)	Est. U.S. Market Share
Monsanto	\$816	22%	\$204	24%
Syngenta	\$616	17%	\$154	18%
Vilmorin	\$765	21%	\$191	22%
Bayer	\$443	12%	\$111	13%
Rijk Zwaan	\$431	12%	\$108	13%
Global CR-4		71%	Est. U.S. CR-4	77%
			Current HHI	1,543
			Post-Merger HHI	2,310

The level of concentration in the vegetable seed

³³ Lianos et al. (2016) at 28.

³⁴ Fuglie et al. (2011) at 2.

³⁵ Mammana, Ivan. “Concentration of Market Power in the EU Seed Market.” Commission by The Greens/EFA Group in the European Parliament. January 2014 at 27.

³⁶ NASS (2014) at Table 9 at 17 and Table 38 at 33.

³⁷ Vilmorin & Cie (2016) at 21.

³⁸ Analysis of global vegetable seed sales and market shares based on corporate data. Monsanto Corporation. “2016 Annual Report: A Limitless Perspective.” 2016 at 24; Vilmorin & Cie (2016) at 21 for Vilmorin and Bayer; Syngenta (2016) at 87; “Rijk Zwaan sales up 14% in FY2016.” *AgraNews*. November 27, 2016; 2015 Euros converted to U.S. dollars with Federal Reserve Board (2017); global commercial vegetable seed market estimated at \$3.7 billion based on Monsanto’s assessment that it controls 22 percent of the global sales; Thompson, Tad. “Monsanto vegetable chief describes his world.” *The Produce News*. April 4, 2017.

³⁹ Fuglie et al. (2011) at 35; Liu et al. (2015) at Table 2 at 30.

⁴⁰ U.S. Department of Justice/Federal Trade Commission (DOJ/FTC). “Horizontal Merger Guidelines.” August 19, 2010 at 18.

market is likely to be considerably higher in developed national markets, like the United States and Europe, and even higher for specific vegetables. For example, the top five firms controlled 95 percent of the European vegetable seed market in 2014.⁴¹ Vilmorin estimated that the top three firms controlled 75 percent of the U.S. market for vegetable seeds in 2015.⁴²

In 2015, the U.S. vegetable seed market was \$860 million.⁴³ The top four firms controlled at least 77 percent of the U.S. vegetable seed market in 2015 (see Table 1) and the proposed merger would substantially increase concentration.⁴⁴ This is likely to considerably underestimate the level of concentration. For example, it estimates Monsanto controls 24 percent of the U.S. market, which is considerably lower than its 39 percent market share when it purchased Seminis.⁴⁵

Even with conservative assessments of vegetable seed concentration, the proposed merger warrants considerable scrutiny by the Department of Justice. This conservative estimate finds that the current market is moderately concentrated with a Herfindahl-Hirschman Index (HHI) of over 1,500 and that the proposed merger would increase the HHI to 2,300 — an HHI increase of nearly 800. The Department of Justice merger guidelines suggest that mergers that result in moderately concentrated markets with HHI increases over 100 points “potentially raise significant competitive concerns and often warrant scrutiny.”⁴⁶

It is almost certain that the level of national vegetable seed concentration is higher and that the proposed merger would result in a highly-concentrated market with an HHI over 200 (even the estimate finds an HHI increase much greater than 200) and the merger guidelines state that these mergers “will be presumed to be likely to enhance market power.”⁴⁷

A. Proposed merger substantially increases processing tomato seed concentration

The proposed merger would likely substantially raise concentration levels considerably higher for specific vegetable crops. Both companies offer a broad range of overlapping vegetable varieties. Monsanto sells over 2,000 varieties of seeds covering 22 kinds of vegetables (green beans, broccoli, cabbage, carrots, cauliflower, sweet corn, cucumbers, eggplant, lettuce, melons, onions, peppers, pumpkins, spinach, squash, tomatoes and more).⁴⁸ Bayer launched a horticulture division in 2013 to push its produce business and sells seeds for 25 types of vegetables.⁴⁹ Bayer’s Nunhems brand sells seeds for carrots, cauliflower, cucumbers, leeks, melons, peppers, squash, tomatoes and

⁴¹ Mammana (2014) at 27.

⁴² Vilmorin & Cie (2016) at 36.

⁴³ LaVigne, Andrew W. American Seed Trade Association. Testimony before the Committee on Agriculture. U.S. House of Representatives. July 12, 2017 at 1.

⁴⁴ Analysis of U.S. vegetable seed sales and market shares based on 25 percent of corporate global vegetable seed sales data. Monsanto Corporation. 2016 Annual Report at 24; Vilmorin & Cie (2016) at 21 for Vilmorin and Bayer; Syngenta (2016) at 87; *AgroNews* (2016); 2015 Euros converted to U.S. dollars with Federal Reserve Board (2017); U.S. vegetable seed sales are about 25 percent of global sales. IndustryARC. “Fruit and Vegetable Seed Market by Type, Others & Geography—Forecast (2016-2021).” September 3, 2016; total U.S. sales. LaVigne (2017) at 1.

⁴⁵ Howard (2009) at 1276.

⁴⁶ DOJ/FTC (2010) at 19.

⁴⁷ *Ibid.*

⁴⁸ Ohlemeier, Doug. “Industry evaluates Bayer’s Monsanto purchase.” *The Packer*. September 16, 2016.

⁴⁹ Monsanto Corporation. 2016 Annual Report at 8 and 32; Ohlemeier (2016).

watermelons.⁵⁰ Despite clear overlaps in vegetable seed production, Bayer downplayed the merger contending that the vegetable seed lines were complements not competitors.⁵¹

Tomatoes are the most valuable vegetable crop and California produces over one-third of the world's processing tomatoes (destined for canning, juice, ketchup, sauces, etc.).⁵² The market for processing tomato seeds is already significantly concentrated. The proposed merger would substantially raise the levels of concentration, giving Bayer-Monsanto the ability and incentive to raise prices and reduce choices for farmers.

In 2015, Bayer and Monsanto were the second and third largest seller of all processing tomato seeds with 23.7 and 14.1 percent of the total market, respectively.⁵³ The total market for processing tomato seeds in California is already moderately concentrated (with an HHI of 2,200 points) and the proposed merger would increase the HHI by nearly 700 points making it highly-concentrated (with an HHI of nearly 2,900). The proposed merger's increase in concentration would "be presumed to be likely to enhance market power."⁵⁴

All Processing Tomato Seeds				Sold Processing Tomato Seeds					
Company	Loads	Market Share	Rank	Company	Loads	Market Share	Rank		
Heinz	193,208	34.8%	1	Bayer (Nunhems)	131,725	39.3%	1		
Bayer (Nunhems)	131,725	23.7%	2	Monsanto (Seminis)	78,363	23.4%	2		
Monsanto (Seminis)	78,363	14.1%	3	Vilmorin (Harris Moran)	78,225	23.4%	3		
Vilmorin (Harris Moran)	78,225	14.1%	4	Woodbridge	16,731	5.0%	4		
United Genetics	27,781	5.0%	5	BHN	10,326	3.1%	5		
Woodbridge	16,731	3.0%	6	Orsetti	2,405	0.7%	6		
BHN	10,326	1.9%	7	Syngenta	196	0.1%	7		
Orsetti	2,405	0.4%	8	All Other	16,911	5.0%	8		
Syngenta	196	0.0%	9						
All Other	16,911	3.0%	10						
			Current CR-4	86.6%				Current CR-4	91.1%
			Post-Merger CR-4	91.6%				Post-Merger CR-4	94.2%
			Current HHI	2,204				Current HHI	2,675
			Post-Merger HHI	2,872				Post-Merger HHI	4,516
			△ HHI	668				△ HHI	1,841

Post-merger, Bayer-Monsanto would have the top market position for all processing tomato seeds with 37.8 percent and would be nearly three times larger than the number three firm (Vilmorin's Harris Moran Seeds) and seven times larger than the number four firm (United Genetics). The

⁵⁰ Gaspar, Kathleen Thomas. "Nunhems adopts new business approach for North America." *The Produce News*. February 12, 2009.

⁵¹ "Monsanto and Bayer complementary re vegetable seeds." *Fresh Plaza*. September 19, 2016.

⁵² Dias and Ryder (2011) at 316.

⁵³ Analysis of AgSeeds Unlimited. "2016 South Sacramento Valley Processing Tomato Production Meeting." January 7, 2016. Includes early, mid-season, extended field storage, F3 and pear varieties. Concentration is considerably higher in these subsets of processing tomato seeds.

⁵⁴ DOJ/FTC (2010) at 19.

substantial gap between the proposed merged Bayer-Monsanto and the number three and smaller firms suggests the merger will undermine competition, as the merger guidelines note that these smaller rivals “may not be able readily to replace competition between the merging firms that is lost through the merger.”⁵⁵

A more appropriate processing tomato seed market would be solely for seeds that are *sold* to farmers. The functional market for processing tomato seeds would exclude the tomato seeds provided under production contracts by processing companies, as independent farmers are unable to purchase these varieties. Heinz processing tomato seeds are provided to contract growers and largely not sold to independent farmers.⁵⁶ Kagome’s United Genetics processing tomato seeds produce fruit for the Kagome’s vertically integrated tomato processing business.⁵⁷

The California market for processing tomato varieties that are not contracted by vertically integrated companies is already highly-concentrated, with an HHI of 2,675 points, and the proposed merger would substantially increase concentration, raising the HHI by more than 1,800 points to over 4,500. In 2015, Bayer and Monsanto were the number one and number two sellers of processing tomato seeds with 39.3 and 23.4 percent of the market, respectively. The proposed merger would give Bayer-Monsanto 62.7 percent of the processing tomato seed market, nearly three times larger than the number two firm (Vilmorin) and more than twelve times larger than the number three firm (Woodbridge). The proposed merger’s increase in concentration would “be presumed to be likely to enhance market power.”⁵⁸ Such an estimate, however, is still conservative as it fails to reflect even greater consolidation in seasonally adapted tomato markets.⁵⁹

B. Concentration in vegetable seed varieties suggests comparable concerns in other vegetable seeds

The hyper-consolidated processing tomato seed could likely exist in markets for seeds of other types of vegetables. There is little available data on the specific geographic and product markets for individual vegetable crops, but there is evidence that the top companies hold considerable control over the available vegetable varieties.

It is likely that the market concentration is considerably higher than the concentration in cultivars. For example, in the European Union, the four largest vegetable seed companies (Monsanto, Syngenta, Vilmorin and Rijk Zwaan) market 40.2 percent of the tomato cultivars and the proposed merger would raise the four-firm cultivar concentration to 43.9 percent.⁶⁰ The market concentration of seeds is likely to be considerably higher — cultivation is not equally distributed among cultivars. For example, Bayer’s Nunhems represented 16 percent of the cultivars but 24 percent of the delivered loads for processing tomatoes. The top four companies controlled 73 percent of cultivars but 87 percent of delivered loads of processing tomatoes, suggesting that modest increases in market

⁵⁵ *Ibid.* at 18.

⁵⁶ Gereffi, Gary et al. Prepared for Healthy Eating Research Program of Robert Wood Johnson Foundation. “The Governance Structures of U.S.-Based Food and Agriculture Value Chains and their Relevance to Healthy Diets.” June 17, 2008 at 46 and 51.

⁵⁷ Sampson, Alex. “Kagome’s claim to be the world’s best tomato processor is no idle boast.” *Melbourne (Australia) Weekly Times*. March 23, 2016; Kagome Co., Ltd. [Press release]. “United Genetics Holding LLC to become consolidated subsidiary of Kagome Co., Ltd.” September 30, 2013.

⁵⁸ DOJ/FTC (2010) at 19.

⁵⁹ Analysis of AgSeeds Unlimited (2016). Includes early, mid-season, extended field storage, F3 and pear varieties. Concentration is considerably higher in these subsets of processing tomato seeds.

⁶⁰ Mammana (2014) at 27.

share of specific cultivars is likely to translate into substantial increases in market concentration. These cultivars are almost exclusively for commercial production as the processing tomato market doesn't include a large number of garden varieties that likely are present, but unused, by commercial producers in other vegetable markets.⁶¹

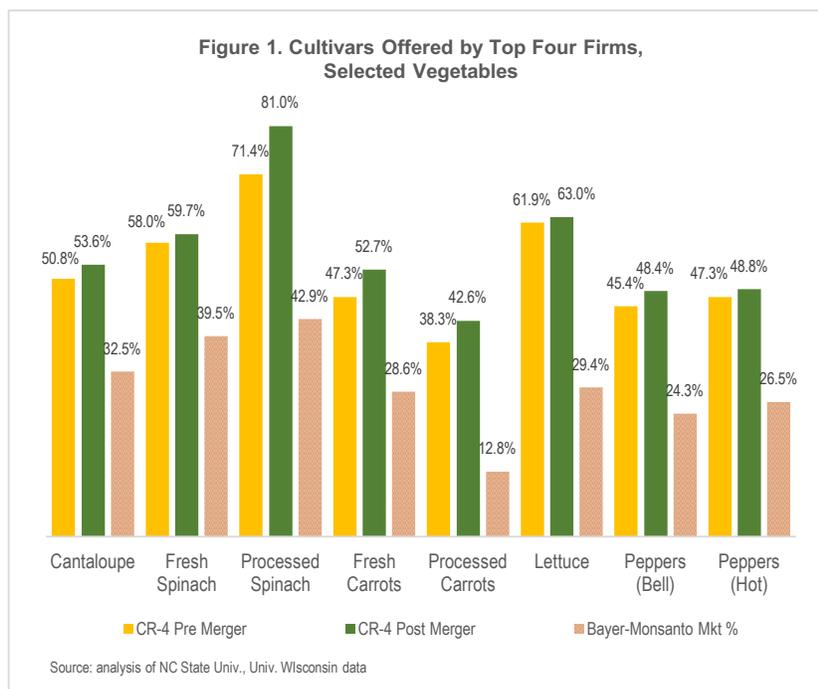
In many types of vegetables, the proposed merger would increase the control a few firms have on the majority of vegetable cultivars and cement Bayer-Monsanto's dominant position (see Figure 1).⁶² Bayer-Monsanto would rank first in all examined vegetable types (cantaloupe, fresh carrot, processing carrot, lettuce, fresh spinach and processing spinach) and would control at least one-third of the market for cantaloupe, fresh spinach and processing spinach.

The concentration of cultivars considerably constrains farmer choices. The proposed Bayer-Monsanto merger would give the top four firms control of more than half the cultivars

for cantaloupe, fresh carrots, lettuce, fresh spinach and processed spinach. Not only are fewer firms controlling a larger portion of cultivars, making it harder for farmers to select varieties outside the seeds produced by the dominant firms, but commonplace arrangements between seed companies and seed dealers can further curtail available choices for farmers.

III. Proposed merger will not foster innovation but strengthens patent control over farmers

Although Bayer and Monsanto have contended that the proposed merger will drive more research and innovation, there is little evidence that seed mergers enhance research into improved seed varieties. Bayer officials stated that the proposed merger would benefit farmers through improved innovation even as the number of seed and agrichemical companies declines dramatically after the



⁶¹ Pittenger, Dennis R. et al. "Growing tomatoes in the Home Garden." *University of California Division of Agriculture and Natural Resources*. Publication 8159. 2005 at 1.

⁶² Analysis of percent of available cultivars based on Wehner, Todd C. (Ed.). North Carolina State University. "Vegetable Cultivar Descriptions of North America." Available at <http://cucurbitbreeding.com/todd-wehner/publications/vegetable-cultivar-descriptions-for-north-america/>. Accessed July 2017; carrot cultivars from Luby, Claire H. and Irwin L. Goldman. "Improving freedom to operate in carrot breeding through the development of eight open source composite populations of carrot." *Sustainability*. Vol. 8. No. 479. May 14, 2016 at 7 to 9.

Dow-DuPont and Syngenta-ChemChina deals.⁶³ The proposed merger is unlikely to enhance innovation, as it allows the firm to flex its market power rather than compete for farmer customers through innovative product competition.

The biggest vegetable seed companies including Monsanto and Bayer are integrated seed companies that research, breed, manufacture and sell vegetable seeds.⁶⁴ The seed companies have strengthened research largely through mergers that have increased market share and captured the target companies' vegetable cultivar portfolio.⁶⁵ These seed companies dominate vegetable seed research and have marginalized public sector breeding and innovation.⁶⁶ In 2014, Bayer and Monsanto combined submitted 36 percent of all European Union Community Plant Variety Protection applications for new vegetable varieties.⁶⁷

The majority of commercial vegetable seed companies have proprietary control over their seed lines through hybridized techniques that reduce or eliminate the reproducibility of the seed cultivar to prevent the seed traits from being used by competitors or small-scale breeders.⁶⁸ These companies also aggressively enforce their proprietary rights on seed and genetic traits through highly restrictive intellectual property protections (such as utility patents and licensing agreements). For example, Monsanto prohibits vegetable farmers from saving and replanting its seeds.⁶⁹ Its seed contracts also set exclusive conditions that ensure farmers can only sell produce that meets specific standards of sweetness, firmness or scent, which Monsanto enforces through rigorous quality assurance testing.⁷⁰ Unlike open, non-hybrid cultivars, these hybrids cannot be successfully replanted in successive generations of saved seeds.⁷¹ Even if farmers wished to replant hybrids to accept lower yields or lower quality crops, quality testing effectively prevents this. Vegetable hybrids are about a century old — sweet corn hybrids were first offered in the 1920s and hybrid onions in the 1940s.⁷²

The use of patented vegetable seeds has been increasing even in advanced markets like the United States.⁷³ By 2006, private companies, using proprietary seeds supplied two-thirds of global crop seeds.⁷⁴ Companies are increasingly focusing on these patented hybrid seeds.⁷⁵ Since 1984, the number of non-hybrid vegetable cultivars available in the United States declined by two-thirds.⁷⁶

Patents are designed to give innovators a safe harbor to develop their products and markets, but seed patents – especially when many traits are held by a small number of firms – can freeze new entrants out of the marketplace.⁷⁷ The combination of patented seed varieties and hybrid seeds

⁶³ Gullickson, Gil. "What Bayer is saying about the Bayer-Monsanto merger." *Successful Farming*. March 2, 2017.

⁶⁴ Fuglie et al. (2011) at 32.

⁶⁵ Dias (2014) at 9.

⁶⁶ *Ibid.*

⁶⁷ Community Plant Variety Office. "Annual Report 2014." Luxembourg: Publications office of the European Union. 2015 at 35.

⁶⁸ Chiarolla, Claudio and Hope Shand. Utviklingsfondet and Berne Declaration. "An Assessment of Private *Ex Situ* Seed Collections." 2013 at 24 and note 81 at 24.

⁶⁹ Szokan, Nancy. "Monsanto develops new veggies without GMO's Frankenfood factor." *Washington Post*. February 14, 2014.

⁷⁰ Paynter (2014).

⁷¹ Moretti (2006) at 15.

⁷² Dias and Ryder (2011) at 300.

⁷³ Vilmorin & Cie (2016) at 14.

⁷⁴ Fuglie et al. (2011) at 11 and 12.

⁷⁵ Dias (2014) at 20.

⁷⁶ *Ibid.* at 21.

⁷⁷ Harl, Neil E. Charles F. Curtiss Distinguished Professor of Agriculture and Professor of Economics, Iowa State University. "The Structural Transformation of Agriculture." Presentation at 2003 Master Farmer Ceremony, West Des Moines, Iowa. March 20, 2003 at 10.

enable seed companies to exert more leverage over farmers who cannot save and replant seeds and are forced to purchase new seed input supplies for every planting season.⁷⁸

The main breeding and research goals of major seed companies focus on a few high-value vegetables and center around post-harvest marketability (durability for transport, long shelf-life and cosmetic appearance) rather than nutrition or yield.⁷⁹ Very few seed companies are developing vegetable seeds adapted to local environments.⁸⁰ Global companies have lower incentives to be responsive to local demands.

The proposed merger will likely reduce rather than inspire vegetable seed innovation and strengthen the grip Bayer-Monsanto has over vegetable farmers. Historically, seed mergers have not improved seed innovation. USDA found that the significant increase in global seed concentration from 1994 to 2009 was not associated with a permanent rise in research investments.⁸¹ A recent analysis found that the mergers that drove rapid consolidation have not contributed to increased introduction of new biotech seed traits.⁸²

IV. Proposed merger raises seed prices for farmers and increases vulnerability to vertical coordination between seed companies, distributors and retailers

The proposed merger will likely further increase the prices farmers pay for vegetable seeds. The tiny number of seed sellers can exert significant oligopoly seller power over farmers. In the United States, farmers spent \$860 million on vegetable seeds in 2015.⁸³ Between 2008 and 2015, seeds and plants made up nearly 9 percent of fruit and vegetable farmers' expenses.⁸⁴ Some seeds can be incredibly expensive. Syngenta reports that "seeds for some high value tomato varieties can be more than double the cost of the equivalent weight in gold."⁸⁵

Even modest increases in seed prices and agrichemical inputs could have substantial economic impact on vegetable farmers. Oligopolistic seed companies do not need to compete on either price or innovation, and the few dominant companies can use their market power to maintain sales revenues knowing that their rivals can tacitly collude on price to maintain their own sales.⁸⁶ A five percent increase in seed and agrichemical input prices for farmers would reduce vegetable farmers' net farm income by an average of 3 percent.⁸⁷

Vegetable seed prices have risen rapidly over the past decade and appear to correspond with the rise in mergers by the largest seed companies (see Figure 2). From 1992 to 2001, the annual change in vegetable seed prices remained fairly steady (declined by 0.6% on average), but prices grew an

⁷⁸ Howard (2009) at 1268.

⁷⁹ Dias (2014) at 18 and 21.

⁸⁰ Dias and Ryder (2011) at 332.

⁸¹ Fuglie et al. (2011) at 14 to 15.

⁸² See American Antitrust Institute, Food & Water Watch and National Farmers Union. Letter to Acting Assistant Attorney General Andrew Finch. In Re. The Proposed Merger of Monsanto and Bayer. JULY 26, 2017 at 3 and 4.

⁸³ LaVigne (2017) at 1.

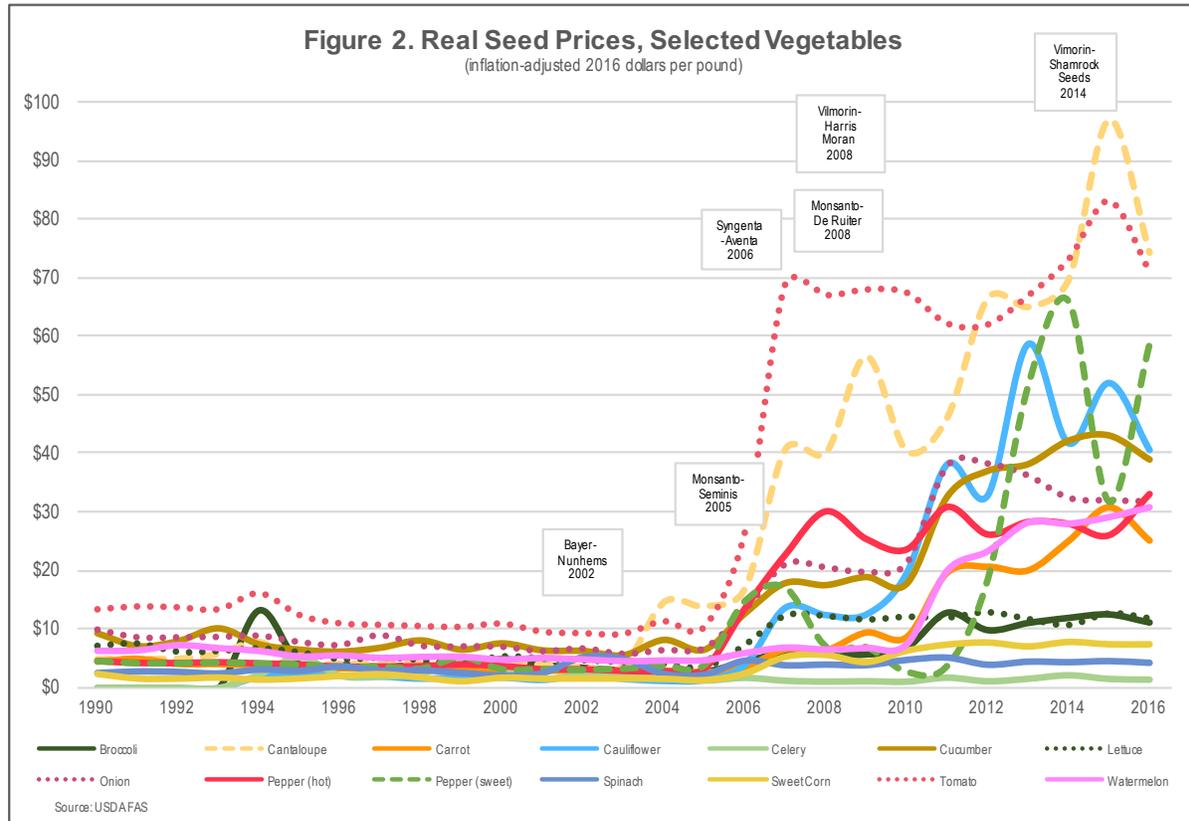
⁸⁴ U.S. Department of Agriculture. Economic Research Service. ARMS Farm Financial and Crop Production Practices survey data. Available at <https://www.ers.usda.gov/data-products/arms-farm-financial-and-crop-production-practices/>. Accessed July 2017.

⁸⁵ Syngenta (2016) at 59.

⁸⁶ Howard (2009) at 1270.

⁸⁷ Analysis of USDA ERS ARMS Farm Financial and Crop Production Practices survey data.

average of 21.4 percent annually from 2002 to 2016.⁸⁸ For high value vegetables like tomatoes and sweet peppers, seed prices were substantially higher from 2012 to 2016 than the five years prior to the Monsanto-Seminis deal (8 times higher for sweet peppers and 5 times higher for tomatoes). Increased prices have not necessarily meant improved yields. For example, cantaloupe yields only increased 1.1 percent annually from 1998 to 2016, but cantaloupe seed prices increased more than 8-fold over the same period.⁸⁹



A. Vegetable seed company vertical alliances disadvantage farmers

Vegetable seed companies are increasingly partnering with processors, retailers and distributors that exert pressure on growers to raise specific varieties.⁹⁰ Half of seed companies have alliances with grocery retailers that have helped drive the development of new vegetable cultivars and some seed companies have exclusive contracts with grocery chains to market specific vegetable varieties.⁹¹ These corporate alliances favor the largest vegetable farms and have contributed to the decline in farm numbers as companies “de-list” farmers that cannot deliver considerable volumes.⁹²

⁸⁸ Analysis of USDA. Foreign Agricultural Statistics. Global Agricultural Trade Service database (FAS GATS). USDA does not keep seed prices for vegetable seeds, but export prices reflect the prices for vegetable seeds. Export volumes and values for broccoli, cantaloupe, carrot, cauliflower, celery, cucumber, lettuce, onion, hot pepper, bell pepper, radish, spinach, sweet corn, tomato and watermelon.

⁸⁹ Analysis of USDA NASS Quick Stats database. Cantaloupe yield (CWT/acre) 1998 to 2016; USDA FAS GATS database.

⁹⁰ Linden, Tim. “Retailers starting to exert influence at seed variety level.” *The Produce News*. April 17, 2012; Ashcroft, Philip W. Verdant Partners. “The Vegetable Seed Industry — Where is it Heading?” *Strategic Insights*. November 6, 2009 at 1.

⁹¹ Liu et al. (2015) at 31 to 32.

⁹² Dias (2014) at 13

Vegetables are typically delivered to retailers or processing plants by a wholesaler known as a shipper. Shippers have gotten larger, especially through marketing alliances, in order to sell into a more consolidated retail marketplace and meet the volume and service requirements of the national retail chains.⁹³ This consolidation means that farmers have fewer buyers and that there is significant vertical integration and coordination between seed companies, manufacturers, grower-shippers and farmers.

Shippers also negotiate and arrange fruit and vegetable delivery contracts with farmers. Contracting has been used to secure supplies of processing vegetables since the 1950s and contracts covered 39 percent of vegetable production by 2008.⁹⁴ The processing industry is extremely vertically integrated, with virtually all processed vegetables raised under some kind of contract.⁹⁵ Some contracts can be quite explicit and constrain farmers' options for seed choice. The majority of processing contracts set the inputs farmers can use and set payment schemes that award bonuses and impose penalties based on quality.⁹⁶

The biggest vegetable trade association players celebrated both Bayer's and Monsanto's existing cooperative partnerships with the vegetable industry when the merger was announced.⁹⁷ The two companies already partner with agribusinesses and retailers to provide custom vegetable seeds. Monsanto has worked with Dole Foods to develop broccoli, cauliflower and lettuce varieties.⁹⁸ It also has been working with "retailers that want solutions to problems," according to the head of Monsanto's vegetable seeds division.⁹⁹

Bayer's Nunhems began working directly with the grower-shippers that buy vegetables from farmers — a shift away from the seed dealers that sell to farmers to the distributors, manufacturers and retailers that buy from farmers.¹⁰⁰ Bayer spent two years collaborating with Walmart to develop an all-season cantaloupe that was 40 percent sweeter — a fruit Walmart is hoping will drive sales.¹⁰¹

The purpose of these vertical alliances between seed companies, agribusinesses and retailers is to produce "product identification that the consumer will pay for, that will create brand identity and that they can charge more for," according to an agribusiness investment banking advisor.¹⁰² As a Monsanto vegetable executive noted, "the goal is to get the products recognized by the consumer,

⁹³ Hoy, Carmen F., Roberta Cook and Richard J. Sexton. "Chapter 4: Marketing California's Agricultural Production." In Siebert, Jerry (Ed.). (2003). *California Agriculture: Dimensions and Issues*. Berkeley, CA: University of California Giannini Foundation of Agricultural Economics: Division of Agriculture and Natural Resources at 94; Cook, Roberta L. Professor, Department of Agricultural and Resource Economics, University of California Davis. "Supermarket Challenges and Opportunities for Fresh Fruit and Vegetable Producers and Shippers: Lessons from the U.S. Experience." Presented at the Conference on Supermarkets and Agricultural Development in China—Opportunities and Challenges. Shanghai, China. May 24, 2004 at 3.

⁹⁴ Hueth, Brent et al. Iowa State University, Department of Agricultural and Resource Economics. "Incentive Instruments in Fruit and Vegetable Contracts: Input Control, Monitoring, Measuring, and Price Risk." March 20, 1999 at 1; MacDonald, James M. and Penni Korb. USDA ERS. "Agricultural Contracting Update: Contracts in 2008." EIB-72. February 2011 at 13.

⁹⁵ Macdonald and Korb (2011) at 5 and 13.

⁹⁶ Hueth et al. (1999) at 16.

⁹⁷ Ohlemeier (2016).

⁹⁸ Tomich (2009).

⁹⁹ Thompson (2017).

¹⁰⁰ Gaspar (2009).

¹⁰¹ Bhattarai, Abha. "Walmart's answer to Aldi and Amazon: 'designer cantaloupe.'" *Washington Post*. June 13, 2017.

¹⁰² Tomich (2009).

trusted, and purchased.”¹⁰³ In some cases, the price premium for these designer vegetables can exceed the prices typically achieved by certified organic products.¹⁰⁴

The proposed merger will strengthen these vertical alliances to the disadvantage of farmers, especially small- and medium-sized farmers who may be less able to deliver larger volumes. Farmers will find it more difficult to not only choose seed but also to have multiple competitive marketing channels for vegetable crops, which ultimately reduces the price farmers receive for their crops.

V. Proposed merger reduces sustainable farming options and consumer choice

The proposed merger will have significant impacts on the food system, food supply and consumers. Seeds are vital to supplying food products — a “disruption in seeds supply may cause a systemic food shock.”¹⁰⁵ Increasing consolidation of the global vegetable seed supply leaves all farmers and consumers dependent on only a few seed suppliers.¹⁰⁶

The biggest seed companies are increasingly committed to “high-tech derived products” that are becoming “an ever-larger part of the vegetable seed portfolio,” according to agricultural analysts at Verdant Partners.¹⁰⁷ In the United States, vegetable production makes up one percent of cultivated land but 14 percent of pesticide applications.¹⁰⁸ Both Bayer and Monsanto’s focus on patented seed traits tied to agrochemical use could spread more aggressively to its vegetable seed products.¹⁰⁹

The consolidation has diminished the genetic diversity of vegetable seeds that can make crops more vulnerable to diseases, pests or weather stresses and can contribute to food insecurity.¹¹⁰ The proposed merger is likely to generally decrease vegetable seed research, including a decline in research into more varieties and types of vegetables. Monsanto vegetable seed research has included traditional breeding as well as more advanced genetic mapping techniques designed to produce more specific qualities.¹¹¹ Bayer has also invested in vegetable seed research and, according to a Bayer vegetable executive, “one of our main objectives has been strengthening ourselves in high-tech vegetables, and investments in this have been increasing for years. This [Monsanto] take-over fits that.”¹¹²

Most of Monsanto’s vegetable research has had a decidedly industrial orientation, for example, grape tomatoes that are 50 percent sweeter than other grape tomatoes with a long “shelf life” gene designed to be shipped thousands of miles from farm to supermarket.¹¹³ Monsanto’s research has aimed to make a host of produce sweeter (and with a higher sugar content), including cantaloupes, watermelon and tomatoes.¹¹⁴

¹⁰³ Paynter (2014).

¹⁰⁴ Dias (2014) at 17.

¹⁰⁵ Lianos et al. (2016) at 3.

¹⁰⁶ Dias (2014) at 9.

¹⁰⁷ Ashcroft (2009) at 2.

¹⁰⁸ Dias (2014) at 14.

¹⁰⁹ Court (2016).

¹¹⁰ Dias (2014) at 9 and 22.

¹¹¹ Monsanto Company. [Press release]. “Monsanto completes vegetable research site expansion.” August 19, 2013; Paynter (2014).

¹¹² *Fresh Plaza* (2016).

¹¹³ Tomich (2009).

¹¹⁴ Paynter (2014).

While the seed market has more than doubled in value in the past 20 years, the market for conventional (non-GM) seeds has diminished.¹¹⁵ Farmers have had difficulty accessing a wide variety of seed options. At the 2010 Department of Justice-USDA workshop on Competition in Agriculture Markets, farmers noted the lack of availability of non-GM seeds.¹¹⁶ The seed supply for organic production also remains insufficient.¹¹⁷ In July of 2017, an organic farmer testified before the Senate Agriculture Committee that he had difficulty finding appropriate tomato seed varieties for his organic operation.¹¹⁸

Monsanto has long been interested in GM vegetables. In the 1990s, it purchased Calgene, the inventor of the commercially unsuccessful GM Flavr Savr tomatoes that could be shipped ripe.¹¹⁹ Monsanto's purchase of the conventional vegetable seed company Seminis posed potential risks of delivering the rigid patent and technology applications of biotechnology to vegetable seeds.¹²⁰ When Monsanto bought Seminis, its chief executive stated that "in the long term, there may be opportunities in biotech [vegetables]."¹²¹ Seminis currently markets the GM virus-resistant squash and Monsanto canceled its GM beetle-resistant potato after fast food companies refused to use them for French fries.¹²² In 2012, Monsanto's GM sweet corn was commercialized, cultivated and marketed to supermarkets.¹²³

The consolidation of the vegetable seed industry has substantial impacts on consumers' food choices and prices. Vegetables are an important category of food. Consuming the micronutrients, vitamins and antioxidants in fruits and vegetables can reduce the incidence of cardiovascular disease and certain cancers and that insufficient produce consumption has been attributed to nearly 3 million worldwide deaths annually.¹²⁴ Although vegetables are a vital part of a nutritious and healthful diet, more than 80 percent of U.S. consumers still eat fewer vegetables than are recommended.¹²⁵

Consolidation of inputs favors processed food industries and degrades the quality of other inputs, limiting healthy choices for consumers.¹²⁶ The proposed deal may make it harder for consumers to find healthy diversity in vegetables or those grown with fewer or less risky pesticides.¹²⁷ The proposed merger would give Bayer-Monsanto more leverage to raise seed prices for farmers, reduce the choice of the crops they can produce and, ultimately, these higher costs would be passed onto

¹¹⁵ Vilmorin & Cie (2016) at 14.

¹¹⁶ USDA and DOJ. "Competition and Agriculture." Washington, D.C. December 8, 2010 at 137 and 148; USDA and DOJ. "Competition and Agriculture." Ankeny, Iowa. March 12, 2010 at 126.

¹¹⁷ See Hubbard, Kristina and Jared Zystro. Organic Seed Alliance. "State of Organic Seed, 2016." June 2016.

¹¹⁸ Cristantes, Theogary Jr. President, Operation Wholesome Harvest. Opportunities in Global and Local Markets, Specialty Crops, and Organics: Perspectives for the 2018 Farm Bill. Committee on Agriculture, Nutrition & Forestry. U.S. Senate. July 13, 2017. Responses to questions by Senators Debbie Stabenow and Kirsten Gillibrand. Available at www.agriculture.senate.gov/hearings/opportunities-in-global-and-local-markets-specialty-crops-and-organics-perspectives-for-the-2018-farm-bill at 1:16 and 1:30.

¹¹⁹ Paynter (2014).

¹²⁰ Moretti (2006) at 11.

¹²¹ Pollack (2005).

¹²² Tomich (2009).

¹²³ Berry, Ian. "Monsanto digs deeper in vegetable seeds." *Wall Street Journal*. June 26, 2012.

¹²⁴ Lock, Karen et al. "The global burden of disease attributable to low consumption of fruit and vegetables: Implications for the global strategy on diet." *Bulletin of the World Health Organization*. Vol. 83, No. 2. February 2005.

¹²⁵ U.S. Department of Health and Human Services and U.S. Department of Agriculture. 2015–2020 Dietary Guidelines for Americans. 8th Edition. December 2015 at 39.

¹²⁶ Gerefi, Gary, Joonkoo Lee and Michelle Christian. "US-based food and agricultural value chains and their relevance to healthy diets." *Journal of Hunger and Environmental Nutrition*. Volume 4. 2009 at 369-370.

¹²⁷ Court (2016).

consumers at the supermarket.¹²⁸ That could mean fewer sustainable or affordable options for consumers and reduced vegetable consumption.

* * *

The proposed Bayer-Monsanto merger would substantially reduce competition in the vegetable seed sector, diminish research into vegetable varieties, erode farmer seed choice, raise input prices and undermine consumers' choices for more sustainable and healthy vegetables. The scale and scope of the deal — including agrochemicals, conventional and GM commodity crops as well as the vegetable seeds discussed here — cannot be remedied through behavioral remedies. The Department of Justice should enjoin the Bayer-Monsanto merger. Absent blocking the proposed deal in its entirety, it is essential that the Department of Justice require the divestiture of the Seminis vegetable seed lines and brands to ensure that sufficient competition remains in the market for vegetable seeds, traits and research.

Sincerely,

California Farmers Union
Community Alliance for Global Justice
Connecticut Northeast Organic Farming Association
Dakota Rural Action
Farm and Ranch Freedom Alliance
Federation of Southern Cooperatives/Land Assistance Fund
Food & Water Watch
Food for Maine's Future
Sustainable Iowa Land Trust
National Family Farm Coalition
National Farmers Union
National Hmong American Farmers
National Organic Coalition
National Sustainable Agriculture Coalition
National Young Farmers Coalition
New England Farmers Union
Northeast Organic Farming Association Massachusetts
Northeast Organic Farming Association of New Jersey
Northeast Organic Farming Association of New York
Northeast Organic Farming Association of Rhode Island
Northeast Organic Farming Association of Vermont
Organic Seed Alliance
Rural Advancement Foundation International–USA
Wisconsin Farmers Union

cc. Kathleen O'Neill, Chief, Transportation, Energy, and Agriculture Section, Antitrust Division, U.S. Department of Justice; Mark B. Tobey, Special Counsel for State Relations and Agriculture, Antitrust Division, U.S. Department of Justice.

¹²⁸ *Ibid.*