

Timothy Hassinger, President and CEO, Dow AgroSciences
Responses to Questions for the Record
Senate Judiciary Committee Hearing on
“Consolidation and Competition in the U.S. Seed and Agrochemical Industry”
September 20, 2016

Questions from Senator Leahy:

1. All farmers, whether they use genetically engineered (GE)-traited technologies or not, are still looking for non-GE choices to expand their rotations and to seek higher value markets. Many of you have discussed the impact that the pending seed and chemical company mergers will have on innovation. Some have argued that the mergers will enhance innovation, and others that it will stifle innovation. Those who are concerned about less innovation if the mergers are approved have noted the difficulty in crafting a potential remedy for that concern, as questions about innovation present unique challenges that are far more complex than simply divesting existing businesses or product lines. What are the potential opportunities and mechanisms for enhancing public plant breeding capacity to address the loss in diversity of seed choices for farmers, and the many needs of farmers that will not be addressed by the private sector, whether or not we continue to see mergers in seed companies?

As you consider the challenges farmers are facing today needing access to seeds that are well adapted to their farming systems, soils, and the changing climate, would you support additional investments in public research on diversification of seed stocks and publically available plant varieties in this country that could lead to greater genetic diversity?

Answer: The U.S. Department of Agriculture (USDA) recently completed a thoughtful and comprehensive review of the role of the public sector in plant breeding:

USDA Roadmap for Plant Breeding

March 11, 2015

Office of the Chief Scientist: Research, Education, and Economics Mission Area

<http://www.usda.gov/documents/usda-roadmap-plant-breeding.pdf>

The review highlighted that there is broad consensus among stakeholders that certain plant breeding related investments are priority roles for USDA and its public-sector partners. These include the National Plant Germplasm System (NPGS) and the education of plant breeders.

The review also highlighted that, in other areas, such as whether plant breeding should be done with public funds, debates persist over public and private-sector roles. The USDA analysis indicates that public-sector plant breeding priorities should reflect a consideration of areas of private underinvestment, as well as continued dialogue with the private sector, rather than hard-and-fast rules (e.g., the public sector does “basic” research while the private sector does “applied” research).

Dow AgroSciences supports additional public investments in plant sciences as a foundational component of ensuring that American agriculture can provide a high quality food supply to U.S. citizens and people all around the world, support a robust and vibrant agricultural economy in the United States, while simultaneously minimizing agriculture’s environmental footprint.

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Questions from Senator Cruz:

1. Earlier this month, the Agricultural and Food Policy Center (AFPC) at Texas A&M University issued a report, “Effects of Proposed Mergers and Acquisitions Among Biotechnology Firms on Seed Prices.” This report concludes that the proposed mergers between Dow and Dupont and Monsanto and Bayer will increase seed prices for corn, soybeans, and cotton. Notably, the report indicates that the price of cotton could increase by almost 20%. Do you have any response to these findings? Will seed prices increase? If not, what did the report get wrong?

Answer: The Dow-DuPont merger is pro-competitive and will not lead to price increases for corn, soybean, or cotton seed. We can't predict the future prices for these seeds products, since the prices are determined by many factors unrelated to the Dow-DuPont merger.

Without going into the technical detail, the Texas A&M University model has many flaws that are biased toward finding increased prices. First, the modeling of how farmers substitute between seeds is unrealistic and does not account for competitive responses from other firms. Second, the study also fails to consider the reduction in marginal costs from the combined firm, which will incentivize the combined firm to lower prices. This is particularly important here because of Dow's in-licensing of germplasm for corn and soybeans. Currently, Dow pays significant in-licensing fees for corn and soybean germplasm. The significant majority of both Dow's corn and soybean seeds contain in-licensed germplasm. Post-merger, the new Ag Company will be able to rely on DuPont's breeding and germplasm, which will avoid these costs. Similarly, DuPont currently relies on in-licensed traits. Post-merger, the new Ag Company will realize cost savings by using Dow's traits. Furthermore, the combined company will achieve additional savings in research and development in seeds and traits in the long-term. Clearly, the Dow-DuPont merger will create a new Ag Company that will be more competitive with seeds and traits over the long-term versus the current industry leader.

DuPont does not currently develop, grow, or sell cotton seeds. Thus, the proposed Dow-DuPont merger will not decrease competition in cotton seeds.

Dow cannot comment as to effects on seed prices resulting from Bayer's acquisition of Monsanto.

2. In the last quarter century, the agricultural industry has consolidated dramatically into the “Big Six” companies that now control the market. With these proposed mergers, it looks like we're heading toward a “Big Four.” In her written testimony, Dr. Moss states that the Dow/DuPont and Monsanto/Bayer mergers “will likely raise entry barriers for smaller innovators and increase the risk that they are foreclosed from access to technology and other resources needed to compete effectively.” Can you respond to this? How would these mergers affect the smaller businesses and entrepreneurs in Texas?

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Answer: Smaller innovators have been very successful in discovering and developing crop protection products and new transgenic traits. For example, Genective has focused on developing transgenic traits for corn and has already developed glyphosate tolerance and is developing both insect resistance and agronomic traits. Many other smaller innovators focus on trait technologies, including Arcadia, Verdeca, AgBiome, Bioceres, Evogene, and Hexima. Dow’s own trait development heritage comes from a smaller company – Mycogen, which Dow acquired during the 1990s. In crop protection, 24 companies, besides the six referenced above, have introduced over 50 new active ingredients in the past 15 years.

These smaller competitors will be no less effective after the Dow-DuPont merger. The Dow-DuPont merger does not increase market concentration substantially and Dow and DuPont have complementary crop protection portfolios. For seeds and traits, to put it simply, DuPont has seeds, while Dow has traits. Combining these complementary capabilities will allow the new Ag Company to better compete, especially with the significant integrated seeds and traits competitor in the marketplace, but it does not raise barriers to entry due to greater concentration.

3. Several of the people I have spoken with in the farm and agricultural industry believe that effects stemming from these mergers should be reviewed collectively. If you disagree, could you please explain why the mergers shouldn’t be reviewed collectively?

Answer: Each merger should be evaluated sequentially on its own merits. Some mergers are pro-competitive because they should lead to lower prices and more product choices for consumers. Other mergers are anti-competitive because they lead to decreased choice and higher prices for consumers. Dow-DuPont is a procompetitive merger. It will result in more, broader crop protection product choices for farmers by bringing together Dow and DuPont’s complementary crop protection R&D capabilities and by creating a better ability to launch mixtures. And in seeds and traits, it will combine DuPont’s germplasm and channel to market with Dow’s traits, creating an integrated, independent Ag Company that is better able to innovate and compete.

Whether the Bayer/Monsanto merger is good for consumers is a different question, and should be evaluated on its own merits.

4. The Wall Street Journal has noted that Federal Reserve policies after the financial crisis inflated asset prices, and more recently, that the end of Fed stimulus has led the dollar to rise sharply, which has given us falling prices in many farm commodities. We have seen this effect very clearly in Texas’s energy industry, which has seen prices fall more than in half since 2014, hitting the entire regional economy. Do swings in commodity prices, specifically crop prices, have a negative impact on the agricultural industry as whole? Would it be better for your company to have a more stable dollar and more stable commodity prices? What role do Federal Reserve policies play when your company makes decisions, such as the decision to merge with another company?

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Answer: Yes, crop prices are directly correlated to the overall health of the agricultural industry. As prices have declined from highs in 2011-2013, farmers have reduced expenditures to compensate for revenue losses with reductions in equipment, fertilizer, cash rent, seed, and crop protection product purchases. Crop insurance and other forms of government support have provided some assistance, but have not offset the decline.

The current strength of the U.S. dollars does make U.S. commodities less attractive in the short to mid-term. Over the last year, corn and soybean exports from Brazil and Argentina have been more attractive to many importing countries, based on the position of their local currency to the dollar, among other factors. Monetary policy to stabilize the dollar globally does reduce one variable affecting the demand equation, but the economic agenda of key commodity exporting countries continues to evolve and impact the attractiveness of U.S. agricultural commodities. Federal Reserve policies are a factor in our industry for overall competitiveness, but would not be categorized as a key driver in our industry for major decisions related to mergers or investments.

Ultimately, commodity prices are driven by supply and demand. Agricultural policy that promotes exports via free trade agreements, expansion of renewable fuels, predictable and science-based regulatory processes, and other demand creation activities drive demand and create opportunities for the American farmer.

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Questions from Senator Perdue:

1. Over the last two decades the ag seed and chemical industry has seen a substantial increase in the cost and time of getting new technologies from discovery and development to farmers in the field. Studies have shown that it takes an average of 13 years and \$136 million to get new biotechnology registrations and 11 years and \$286 million to get new crop protection products to market. A large portion of these increased costs are from the increasingly complex federal regulatory framework. In what ways do federal regulations specifically impact your company’s process from discovery to registration?

Answer: Regulatory oversight of **biotechnology** traits in the United States is shared between the U.S. Department of Agriculture (USDA), the Food and Drug Administration (FDA), and the Environmental Protection Agency (EPA). Each of these agencies is a recognized world-leader in their scientific expertise and each agency is dedicated to ensuring that new technology is made available to U.S. agriculture in a timely manner, while still protecting human health and the environment. Developers of biotechnology traits also seek regulatory approvals in countries where U.S. crops are exported in order to protect market access for American farmers. The large increases in the costs and timelines required to obtain regulatory approvals is a result of the increased regulatory burden coming from these federal agencies and the foreign countries where the agriculture commodities are exported. Regulatory processes in several important export markets have slowed down over the last five years and trait technology developers have also seen a significant increase in the amount of scientific data requested, despite no new risks having been identified. Additional countries are implementing new regulations for biotechnology traits, which further increases the overall regulatory burden for technology developers. Each subsequent regulatory review for a specific product conducted by regulatory authorities outside of the United States adds negligible value to the assessments previously completed by the federal agencies, as the review conducted by the U.S. agencies is comprehensive in scope.

Regarding oversight of **crop protection products**, the Federal Food, Drug and Cosmetic Act (FFDCA); the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA); and the Food Quality Protection Act (FQPA) provide the U.S. federal regulatory framework relevant to new and existing crop protection technologies. These vehicles, administered by the EPA and FDA, are vast, dynamic, and complex. The intricate and convoluted federal laws create a regulatory environment too often lacking in predictability and timeliness. Variability in regulatory data requirements and interpretations by the regulatory authorities routinely lead to review and approval delays, surprising and unnecessary restrictions on the technologies and, in some cases, baseless approval rejections.

Undoubtedly, at least part of the regulatory uncertainties and delays for both biotechnology and crop protection products are driven by the inevitable litigation initiated after deregulation or registration decisions are adopted by the agencies. In the current regulatory and litigation environment, litigants are able to capitalize on the complex regulatory scheme for

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biotechnology and crop protection products to delay the introduction of new technologies available to farmers and to drive up the costs of the R&D-based agricultural companies.

1A. In what ways could this regulatory burden be eased on your company?

Answer: With regard to **biotechnology**, the U.S. regulatory agencies (USDA, FDA, and EPA) should continue their efforts to seek global harmonization and simplification of regulatory approval processes – such as with the systems recognition process that FDA has implemented with New Zealand and Canada – to ensure that the U.S. biotechnology regulatory system remains the international standard.

With regard to **crop protection products**, the variability in regulatory data requirements and interpretations by the regulatory authority routinely lead to review and approval delays, surprising and unnecessary restrictions on the technologies and, in some cases, baseless approval rejections. These issues could be readily addressed with standardized data requirements, review timelines, and interpretations.

2. How would you describe the impact of the proposed Dow-DuPont merger on American and global agriculture?

Answer: The Dow-DuPont merger will benefit both American and global agriculture by enabling the new combined Ag Company to bring more new products to market more quickly, offering farmers greater product choice and responding more quickly to changing market needs. By combining the complementary R&D capabilities of Dow and DuPont in both crop protection and seeds and traits, the new company will be able to innovate new products that neither company could have developed independently.

In crop protection, the new Ag Company will aim to increase its discovery and development of new active ingredients compared to the combined total of what each company does independently today. Because obvious crop protection innovations have already been found and environmental regulations further restrict what can be registered, innovation going forward will be about going deeper to find sustainable solutions. The Dow-DuPont merger will give the new combined company a broad set of capabilities to help it do this better and faster. And in addition to developing new active ingredients, the merger will enable the new combined Ag Company to develop new formulations and mixtures of active ingredients that neither company could do independently, leading to more effective products for consumers.

The new combined Ag Company will also be a stronger seeds and traits competitor. DuPont’s seeds business will provide a channel to market for Dow’s transgenic traits, increasing market competition and encouraging further traits innovation. Today, only one company has both a strong seeds and traits business. The combination of Dow and DuPont will provide an alternative. Moreover, today Dow faces difficulty in monetizing its investment in transgenic traits because it lacks a path to market. DuPont’s seeds business

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provides that path. This will make traits R&D more profitable going forward, and encourage the new combined Ag Company to continue and increase its plant breeding and traits innovation.

3. How will this merger make you a more competitive player in the agricultural marketplace?

Answer: First, the Dow-DuPont merger will make us more competitive by making us a better innovator. But there are also many other ways the new combined Ag Company will be more competitive. For example, the new combined Ag Company will be able to offer Dow and DuPont’s complementary product portfolios to customers, providing customers more choice. In addition, the combined company’s increased scale and efficiency will reduce input costs, resulting in savings that would be available to be passed on to farmers. Beyond this, in seeds and traits, the combination of DuPont’s germplasm and Dow’s traits will create a strong, integrated competitor in the marketplace, something the market lacks entirely today.

4. What is your rationale for combining Dow and DuPont? How will it impact your company legacies?

Answer: Dow and DuPont are highly complementary companies in agriculture (as well as in other areas), with a combined scale and balance of agricultural offerings that will allow the new combined Ag Company to more fully meet farmer needs. The combined company’s products will be built from new technologies derived from a robust R&D engine fueled by agricultural research. Combining Dow and DuPont’s complementary portfolios will result in one of the most comprehensive and diverse product portfolios in the world, giving more choices than ever to our customers.

The companies have complementary capabilities in crop protection which will allow the new combined Ag Company to develop more new active ingredients and to respond more quickly to regulatory changes and pest resistance issues. In addition, the new combined Ag Company will be able to develop new mixtures of active ingredients and new formulations, leading to more effective products for farmers.

The combined firm will also be a much stronger seeds and traits competitor. Although Dow is strong in developing transgenic traits, it has not been able to effectively commercialize these traits because it lacks a predictable channel to market. DuPont has high-quality germplasm and a strong seeds business but has not been successful in commercializing its own traits. The new combined Ag Company will be able to market Dow traits in DuPont germplasm, giving American farmers greater choice. In addition, access to DuPont’s germplasm will allow Dow to be independent of its major traits competitor from whom it in-licenses germplasm today. Similarly, access to Dow’s transgenic traits will allow DuPont to be more independent of its largest seeds competitor from whom it must in-license traits today. This will create a new strong seeds and traits competitor with differentiated products.

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The merger and subsequent spin into three separate companies will allow both companies to further their legacies. Dow will become the materials science company and will remain headquartered in Midland, Michigan, which is consistent with Dow’s roots. Likewise, the new Ag Company and new Specialty Company will be headquartered in Wilmington, Delaware, the location of DuPont’s current headquarters and rich legacy. Going forward, these companies will continue to be proud American companies, with a better ability to compete with foreign competitors.

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Questions from Senator Blumenthal:

1. How does the elimination of \$1.3 billion in R&D spending (as referenced on the website created by your two companies and designed to provide information on the merger) improve market competitiveness?

Answer: The companies have announced \$3 billion in cost synergies resulting from the merger across all three business units of Dow and DuPont (Material Science, Specialty, and Ag), with 10% of that total expected to come from the research and development (R&D) function. The estimated reduction in R&D expenses will come from the elimination of duplicative R&D spending across all three business units and will not reduce R&D output for consumers. Instead, by bringing the two companies together, the same amount of R&D research – or more – can be done for less money. This benefits consumers because more efficient and focused R&D organizations will engage in more R&D going forward, and introduce more new products to the marketplace faster. For instance, the R&D organization for the new Ag Company will be able to adopt the best practices and processes from each company to increase productivity and efficiency. While duplicative costs will be eliminated, complementary R&D capabilities will be preserved and expanded.

2. If the merger of your two companies is to combine “complementary” assets of each company, why is there such a gain to be made by eliminating “redundancies” between the two?

Answer: All companies that work to innovate in crop protection and seeds and traits have a basic level of capabilities that are pure duplication. Eliminating this duplication does not decrease innovation capability at all, and allows Dow and DuPont to spend R&D funds more efficiently, getting more “bang for the buck.” But beyond these basic capabilities, there is differentiation. Companies differentiate themselves into other areas of innovation capability that they feel are helpful in meeting their innovation goals. When combined, the areas of complementarity between Dow and DuPont unleash new capabilities that will allow the new combined Ag Company to bring more new products to the marketplace. For example, Dow has great expertise in natural products that will fit well with certain DuPont testing capabilities.

- 2A. Can you explain in detail the redundancies that will be eliminated and how these eliminations of head-to-head R&D will not harm consumers?

Answer: Dow and DuPont are still identifying the R&D redundancies that will be eliminated. This is an ongoing process and much of the work cannot be done until post-merger. However, below are some of the areas in which Dow and DuPont hope to realize synergies by eliminating duplication, without eliminating unique R&D capability from the marketplace.

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Cost Synergy Area	Description
Breeding	Integrated corn and soybean breeding between Pioneer and Dow
Regulatory Sciences & Affairs	A single, combined organization responsible for conducting regulatory testing and obtaining and maintaining registrations
Technology Innovation & Breeding Systems	A single, combined support organization for breeding
Integrated Field Sciences	A single, combined field organization to test crop protection and traits products
Centralized Services	A single, combined administrative support organization for seeds, traits, and crop protection
Data Science	A single, combined informatics and data management organization with greater capabilities that allows bringing work in-house from contractors
External Technology	A single, combined organization to identify and deliver external technology and collaborations