Aimpoint RESEARCH®

A FUTURE WITHOUT GLYPHOSATE

EXECUTIVE SUMMARY

ASSESSING THE IMPACTS AND COSTS TO AGRICULTURE AND THE ENVIRONMENT

June 2023

EXECUTIVE SUMMARY

The report “A Future Without Glyphosate” leverages multiple research and analytical methods, including open-source research, economic modeling, subject-matter expert interviews, and military wargaming techniques to understand the complexities of glyphosate’s impact on agriculture and outline what the future could look like without it.

Glyphosate is the most widely used herbicide in the United States, first registered as a pesticide with the U.S. Environmental Protection Agency (EPA) in 1974. Since that time, it has proven to be an effective, cost-efficient weed control tool and enabled farmers to add conservation practices to millions of additional acres year after year by moving from full tillage to conservation tillage, no-till, and/or cover crops. These practices create healthier soils, cleaner water, and climate resiliency through carbon reduction. A recent series of challenges in the U.S. Court of Appeals and ongoing public debate has led many to question what a future without glyphosate would look like.

We assess that if glyphosate were no longer available, markets would adapt through substitution and adjusted practices, but at a substantial cost to farmers and the environment. U.S. farmers would bear the burden of increased input and operating costs with small farmers disproportionately affected. Further analysis reveals a cascading chain of likely higher order effects and unintended consequences, the most impactful being the rapid release of additional greenhouse gases and the reversal of decades of conservation and sustainability gains.

GLYPHOSATE TODAY

Glyphosate is a non-selective herbicide that blocks an enzyme essential for plant growth. It is widely used in U.S. agriculture because it is highly effective at killing most plants. Several commodity seed companies have successfully created varieties which can tolerate glyphosate, allowing farmers to apply the chemical in active fields without killing the cash crop. Some weed varieties have evolved and developed resistance, but glyphosate remains in a high percentage of mixes as one-in-many modes of action.

A FUTURE WITHOUT

Our desired outcome is to describe how the agri-food value chain will adapt to, and the plausible consequences associated with, a U.S. farming system without access to glyphosate. Therefore, we explored multiple situations which could reasonably lead to glyphosate no longer being available to U.S. farmers. We are not focused on, nor do we address, how to identify or avert the situations considered.

This final future statement served as the stimulus for eliciting subject matter expert feedback, assumptions, and theoretical actions.

"You are one of several actors within the U.S. agri-food value chain just learning that glyphosate is no longer allowed to be used in the United States. Describe how your operations, business, or practices would react."

FUTURE SCENARIO

Aimpoint's internal team of analysts, economists, and geopolitical experts leveraged the insights of outside topical expert advisors and conducted an internal wargame process to drive the future state scenario analysis.

The following is a summary of the scenario derived from the reactions of subject matter experts when confronted with the future statement, mapping of anticipated decisions, and integration of mathematical modeling where applicable.

Farmers react and endure higher costs starting in year one.

Costs remain high in year two as weed pressure and herbicide resistance increase.

Crop Production finds equilibrium in year four at the expense of conservation and environmental impact.

Farm consolidation accelerates as smaller farmers are pushed out.

There is substantial political pressure to restructure the farm bill.

Massive setbacks occur in research and investment in the agrichemical sector.

Chemical alternatives to glyphosate present environmental and health risks.

Increased soil tillage leads to less carbon capture and more emissions.

Decreased cover cropping degrades water quality and soil health.

Suppliers of alternate technologies gain market leverage.

Herbicide manufacturers increase production of alternatives, overburdening the regulatory approval process.

Advocacy groups refocus strategies to target other herbicides.

IMPACT MODELING

Aimpoint conducted modeling and analysis in five key areas: Economic Impact on Agriculture, Environmental, Geopolitical, Food Prices, and Innovation.

ECONOMIC IMPACT ON AGRICULTURE

Soybean, corn, wheat, and cotton growers' resort to alternative chemistries and increased tillage practices to control weeds. Use of alternative chemistries would cause a 2 to 2.5 times increase in cost per acre, while switching to tillage could increase production costs by over $1.9 billion.

ENVIRONMENTAL

Alternative products, often unsuitable for a variety of crops or not applicable for large-scale farming, will negatively impact conservation efforts. Higher bioaccumulation factors, lower adsorption factor ratings, and increased Environmental Impact Quotient (EIQ) ratings could compromise water quality, wildlife, aquatic species, and overall health and safety. Increased tillage could also disrupt soil health and increase erosion and emissions, with a potential release of 33.72 million tons of CO_2 equivalent. Farmers would likely decrease double cropping and cover cropping, reducing soil carbon capture and impacting renewable fuels.

FOOD PRICES

The increase in production costs add inflationary pressure on food prices. The inflationary pressure from the heightened production costs would also decrease consumer spending on proteins and increase the procurement costs of federal nutrition programs, such as SNAP.

INNOVATION

Progress towards the development of future weed control technologies stalls due to limited return on investment and regulatory uncertainty, particularly in the development of biological products.

GEOPOLITICS

China's burgeoning glyphosate market would likely continue growing, allowing their agriculture sector to benefit from increased production efficiency and conservation. The EU may face amplified challenges due to historic resistance to such innovations, while countries like Mexico might consider U.S. regulations as indicative of broader trends, despite an overall global shift towards accepting agricultural innovation.

CONCLUSION

The loss of glyphosate as an agricultural production tool would not be trivial. Alternative products to glyphosate exist, but at a much higher per-acre cost; likely replacements would increase the cost of herbicide inputs by two to two-and-a-half times. Without glyphosate there would be an increase in soil tillage for weed control, which would significantly increase farmers' cost of production, both for labor and machinery. Less soil carbon will be captured, and emissions will increase from additional fuel use.

New innovations are not yet at commercial scale to overcome the near-term economic shock of an immediate loss of glyphosate. Combined with the heightened political risk of regulatory action, the loss of glyphosate would result in a chilling effect on further research, development, and investment in the advancement of new technologies.

Though the most severe effects would be borne at the farm level, marginal changes in the increased carbon intensity could reduce market demand for corn and soybeans used as renewable fuel feedstock. Commodity production costs would rise for food and feed use, with the aggregate higher cost being passed through to end users of renewable fuels and meat, poultry, dairy and eggs.

Access the full report with citations at www.AimpointResearch.com