Maintaining Key Resources Amid Strategic Uncertainty

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INTRODUCTION

Changes in production agriculture have altered the level and type of risk faced by farmers. Farm managers face a variety of challenges including shifts in decision making processes (data driven insights), changing metrics for farm performance (sustainability), different day-to-day practices, new technologies, increased global competition in commodity markets, and novel strategies to manage risk at the farmgate. These challenges present significant risks which permeate through targeted risk management strategies and prompt the need for an integrated risk management approach. This article ties together our previous discussions of risk in production agriculture, which includes integrated risk management (Lippsmeyer, Langemeier, and Boehlje, 2024a) and the importance of strengthening key resources (Lippsmeyer, Langemeier, and Boehlje, 2024b; Lippsmeyer, Langemeier, and Boehlje, 2024c).

CHANGE ON THE HORIZON

Many of the risks in production agriculture are also present for large scale agribusinesses and manufacturing companies, but risk mitigation strategies and resource availability differ. Agribusinesses often have a much greater focus on mitigating strategic risk and strengthening organizational resources including process efficiency, brand recognition, business strategy, knowledge sharing, and cross training of employees. For larger businesses it is more common to have multi-year forecasts, long-run business plans, and a full-time risk officer in charge of mitigating risk and guiding the business plan through disruptions. Allocation of resources to this purpose leads to being more aware of emerging risks and more proactive in developing contingency plans.

Costs associated with allocating time or funds to perform market research, developing strategy, assessing risks, and evaluating changes in the business environment are high. Farms may be unable to justify costs associated with hiring a risk officer, lack qualified employees for that position, or only have limited time to dedicate to performing such duties.

An alternative solution to hiring an employee for market research and risk evaluation is involvement in peer groups. Peer groups with constituents that are not your competitors nor necessarily in the same industry can provide meaningful insights on major economic shifts of concern. Discussions about labor retention, data analytics, interest rates, evolution of trade agreements are all factors influencing production agriculture, but also many other industries. Engaging in peer groups is useful to identify challenges to key business resources and pinpoint strategies to maintain or improve your farm's resource base in anticipation of shocks or stressors in the business environment.

For production agriculture there is significant opportunity and risk associated with the development of artificial intelligence and automation. This is an example of where observing change in other industries or other geographic regions can be useful in developing an effective adaptation strategy. In many ways manufacturing closely resembles farming – some describe it

as biological manufacturing. However, the manufacturing industry has more effectively incorporated the use of data driven insights and automation. Manufacturing firms use immense levels of automation combined with human resources to improve effectiveness of labor and reduce production costs (Acemoglu and Restrepo, 2022). As U.S. production agriculture is faced with increasing labor costs; growing use of artificial intelligence; and automation for planting, spraying, and harvesting; innovations and adaptations in other industries should be used as an antecedent in developing farm strategy.

Solinftec's Solix Sprayer is one of the early examples of automation in production agriculture. This company is very successful in South America using solar powered autonomous sprayers equipped with artificial intelligence driven see and spray for weed and pest prevention. Solinftec monitors more than 80% of all sugar cane production in Brazil and is steadily expanding field trials year after year for corn and soybean production in the U.S. (Solinftec, 2024). This is an example of a cutting-edge technology for U.S. production agriculture which has already been adopted more broadly in other geographic regions (South America). Other changes in the production environment include shifts towards yield-based guarantees which further reduce production risk. Growers Edge, in partnership with Munich Re, has developed a Crop Plan Warranty Program which encourages adoption of their new products and production practices by offering compensation for yield levels below an established benchmark (Growers Edge, 2024). Adoption of this model has the potential to further increase the speed of technology adoption and the use of new production practices by reducing downside risk. Farmers should keep a watchful eye on trends evolving in their local areas, but also regions with greater consolidation levels and similar cropping practices, as they likely foreshadow evolution of domestic production systems.

The potential for product differentiation presents another source of strategic uncertainty. Production and cost efficiency were historically the core determinants of U.S. farm performance. That is, most producers were successful if they were proficient on the production side and had relatively low per-unit costs. However, global commodity markets are challenging this strategy. U.S. producers are steadily shifting away from commodity markets and into differentiated product markets at the farm level, rendering production efficiency alone an inadequate business strategy. This shift is characterized by production of value-added products where producers are focused on strategies to capture premiums.

As a result, portfolio complexity is becoming much more common with farms producing commodity corn, waxy corn, popcorn, white corn, non-GMO soybeans, conventional soybeans, and seed soybeans all within the same operation. Differentiated products use many of the same production technologies but expand the revenue stream for the farm and decrease dependence on any singular revenue source.

PRESSURE TO EVOLVE

Changes in production technologies, data collection capabilities, and risk mitigation strategies have occurred in recent years, making it difficult to sustain a farm's competitive advantage. Technological advancements improve yields and drive down production costs, while novel risk mitigation strategies aim to protect farms from downside risk. These changes have resulted in more complex decisions for farm managers, having to weigh the benefits and costs of adopting new technologies, business strategies, and risk mitigation efforts. The rapid rates of change create difficulties for producers to adapt to emerging market trends in an effective manner, particularly for smaller scale farmers with various duties and responsibilities. As a result, the complexity of farm management has been identified as a key contributor to consolidation in

production agriculture (Langemeier and Boehlje, 2017). Decision makers are spread thin managing these uncertainties, causing producers that are unable to adapt effectively to exit the industry, and those able to adapt managing larger farming operations.

Farm management and production technologies have progressed considerably in recent years. Changes include adoption of genetically engineered seeds, use of irrigation, varying tillage methods, use of contract sales, increases in production efficiency with mechanization, and product differentiation (O'Donoghue, et al., 2011). However, with high investment costs and varying degrees of uncertainty, adoption rates for new "smart farming" technology and management practices have been modest for even the most proactive farm managers.

A survey by the Purdue University Center for Commercial Agriculture assessed farm adoption of several precision agriculture technology practices in April of 2023. Survey results indicated that less than 75% of commercial producers had adopted one or more of the listed precision agriculture technologies with 69% having adopted yield monitors and a much smaller proportion (27% of respondents) adopting drone technologies (Lippsmeyer, et al., 2024). Additionally, the study surveyed adoption of various management practices, finding only 55% of producers reported using succession plans, 61% using written crop lease agreements, and 51% using financial ratios to inform on farm decisions. These low adoption rates for precision agriculture technologies and their connection with perceived managerial ability indicate that while adoption of management practices and precision agriculture technologies has increased, there remain significant disparities between practices farm managers have adopted versus what could be adopted. These variations across farms are what create competitive advantages for early adopters, but also high degrees of inefficiency for laggards.

Compounding these stressors, formal management training is not comprehensive, creating variability in management acumen and dependence on trial and error (accumulated experience). Most training programs are structured with management training and risk mitigation strategies which fit into predetermined silos: managing farm finances and financial risk; managing market risk; managing human resources and human risk; legal risk management including contract growing or lease agreements; and managing production technologies, inputs, and production risk. Courses are often effective at guiding improvement of management in each aforementioned area and reducing these specific types of risk, yet they leave managers unprepared to effectively manage interaction between resources, particularly organizational resources and mitigate risks which seep further into an operation. As a result, even producers who pursue formal management training may still lack an effective business strategy to mitigate risks that simultaneously affect several risk types.

In our previous discussion of key resources, we devoted significant attention to organizational resources, including business strategy, reputation, and process efficiency, and resilience (Lippsmeyer, Langemeier, and Boehlje, 2024c). These resources lack tangibility but are highly relevant for farm managers in an industry characterized by profound structural change with a significant chance of being out of position strategically. Managing organizational resources can be addressed using an integrated risk management approach which addresses different types of risk in a comprehensive manner, rather than the "siloed" approach commonly used in agriculture. In contrast, this integrated approach encourages producers to reflect on current and future business strategy, assess performance, and even develop a "smart exit" strategy if a business's strategic positioning needs realignment. An integrated risk management approach uses scenario analysis and contingency planning in addition to off the shelf risk management tools to mitigate potential losses.

CONCLUSION

Changes in global competition, production technology, new product development and resource constraints have increased the strategic uncertainty faced by individual agricultural producers. Compounding factors, including capital constraints, labor shortages, and technological complexity, complicate the role of farm management and a farm's ability to maintain parity with rates of change in the industry. Management training and risk mitigation strategies which fit into predetermined silos are often ineffective in preparing farm managers to effectively manage their operation amid strategic uncertainty. The degree and speed of change in agriculture presents a need for integrated risk management at the farm level, which requires implementation of a clearly defined business strategy - agile enough to adapt to unanticipated events. This article is meant to explore challenges in agriculture and foreshadow those expected to develop further in years ahead. We encourage producers to use this article as a starting point in discussions for developing their farm's strategic plan.

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