

WHAT HAPPENS ON THE FARM STAYS ON THE FARM: THE FORMIDABLE THREAT OF TRADE SECRET THEFT IN AGRICULTURE

Jackson R. Westen[†]

Abstract587

I. Introduction.....588

II. General Background and Significance of Trade Secrets in Agriculture.....590

III. Threats and Ramifications of Economic Espionage and Trade Secret Theft
.....596

IV. Existing Approaches to Protecting Trade Secret Information.....600

V. Implications of Economic Espionage on Trade Secret Law and Future
 Considerations602

VI. Conclusion.....605

ABSTRACT

Intellectual property is a cornerstone of almost every American business. Thus, the protection of intellectual property is essential in allowing businesses to profit from their investments. Trade secrets, one of the more forgotten and unfamiliar forms of intellectual property, are an effective form of protection that farmers and agriculture companies may utilize to protect any internal methods, procedures, data, or unique products and processes which may otherwise be unprotectable under other forms of intellectual property protection. However, there is a growing threat of economic espionage against American companies, with agriculture companies at the forefront. Trade secrets and other forms of intellectual property developed by these entities have been subject to misappropriation, which can lead to devastating economic consequences. Recent cases of theft by Chinese nationals have shined a light on the vulnerability and fragility of trade secret protection in agriculture and exposed the current state of trade secret law. Congress has attempted to pass several bills designed to combat trade secret theft from Chinese nationals, but few have come to fruition, which has

[†] Jackson Westen is a 2025 J.D. Candidate at Drake University Law School. He graduated from the University of Iowa in 2021 with a Bachelor of Arts in Biology. He is interested in intellectual property and business law, with experience clerking at an intellectual property firm and conducting regulatory work for an insurance company analyzing environmental laws.

ultimately resulted in reliance on current laws and practices that may be obsolete. This Note aims to provide a background on trade secret laws and analyze the significance of trade secret protection in agriculture, including why it should not be overlooked in favor of other forms of intellectual property protection. Most importantly, it reviews recent incidents of trade secret misappropriation, highlights effective strategies to prevent future occurrences of theft, and analyzes the current state of trade secret law and congressional efforts to prevent economic espionage against American agriculture companies.

I. INTRODUCTION

When one thinks of intellectual property protection, the three categories that generally come to mind are patent protection, trademark protection, and copyright protection. However, trade secret protection is often overlooked and ignored for a variety of reasons.¹ This is particularly true when discussing intellectual property rights afforded to farmers and agriculture companies, considering the prevalence of patent protection, and emergence of plant patents.² Nevertheless, trade secrets have proven to be a powerful form of intellectual property protection in agriculture, enabling farmers to protect data³ and agriculture companies to protect processes, formulas, methods, etc. they deem to be of value.⁴ The vulnerability of this protection has been exposed in recent years, however, and farmers and agriculture companies may face serious consequences if the threat of espionage continues to escalate.⁵

The nature of trade secret protection is unique in that it has the potential to last forever, but this distinctive feature makes trade secret protection rather fragile, and subject to misappropriation.⁶ Trade secrets are protected by a combination of

1. *Trade Secrets*, ADLER POLLOCK & SHEEHAN P.C. (Sept. 4, 2024, 11:10 AM), <https://www.apslaw.com/trade-secrets/> [https://perma.cc/6F65-EFKM].

2. *How to Protect Your Intellectual Property in the Highly Competitive, and Highly Essential, Field of Agriculture*, INNOVATORS LEGAL (Mar. 28, 2023), <https://innovators.legal/agtech-ip/> [https://perma.cc/A6DB-HPD5].

3. See Todd Janzen, *Is Farm Data a Trade Secret?*, JANZEN AG L.: JANZEN AG TECH BLOG (Sept. 30, 2015), <https://www.aglaw.us/janzenaglaw/2015/9/30/is-farm-data-a-trade-secret> [https://perma.cc/Z6F5-ZGWH].

4. *How to Protect Your Intellectual Property in the Highly Competitive, and Highly Essential, Field of Agriculture*, *supra* note 2.

5. FED. BUREAU OF INVESTIGATION, DEP'T OF JUST., AGRICULTURAL ECONOMIC ESPIONAGE: A GROWING THREAT 1 (2024) [hereinafter AGRICULTURAL ECONOMIC ESPIONAGE], https://www.usaha.org/upload/Announcements/180120_Agricultural_Economic_Esp.pdf [https://perma.cc/PJ5A-FGM8].

6. See CHRISTOPHER T. ZIRPOLI, CONG. RSCH. SERV., IF12315, AN INTRODUCTION TO TRADE SECRET LAWS IN THE UNITED STATES 1 (2023).

both state and federal laws.⁷ For information to be regarded as a trade secret it must meet two specific criteria.⁸ First, the protected information must offer an economic benefit to the owner because it is not generally known, and second, the owner must take reasonable steps to keep the information secret.⁹ Trade secrets have their drawbacks, but this distinctive protection afforded to the owner should not be ignored.¹⁰

American corporations and businesses, including agriculture companies, take advantage of the protections offered by trade secrets.¹¹ Generally, any form of confidential business information that provides a competitive advantage may qualify as a trade secret.¹² Consequently, anyone may be eligible for trade secret protection, including farmers.¹³ Data compiled by farmers is not commonly eligible for patent, trademark, or copyright protection.¹⁴ The essence of trade secret law, however, allows farmers to protect their data in a way that would otherwise be unavailable under more traditional forms of intellectual property law.¹⁵

A growing threat of economic espionage and trade secret theft has emerged in recent years, leaving many businesses and individuals with uncertainty.¹⁶ Trade secret theft is a form of industrial or economic espionage and has been declared a matter of national security by the United States government.¹⁷ This threat is penetrating the agriculture industry, with nations such as China realizing it is much cheaper and easier to steal agricultural information from the United States than to undertake the independent development of similar information or technology.¹⁸ Events occurring in the past decade involving Chinese Nationals and scientists have confirmed China's interest in United States agriculture, with corporations as

7. *Id.*

8. *Id.*

9. *Id.*

10. *See id.*

11. *See How to Protect Your Intellectual Property in the Highly Competitive, and Highly Essential, Field of Agriculture*, *supra* note 2.

12. *Frequently Asked Questions: Trade Secrets*, WORLD INTELL. PROP. ORG. (Sept. 4, 2024, 11:15 AM), https://www.wipo.int/trademarks/en/trademarks_faqs.html [<https://perma.cc/4A8S-PJFH>].

13. *See Janzen*, *supra* note 3.

14. *Id.*

15. *See generally id.*; ZIRPOLI, *supra* note 6, at 1.

16. *See Trade Secrets*, *supra* note 1.

17. *Id.*

18. *See generally* AGRICULTURAL ECONOMIC ESPIONAGE, *supra* note 5, at 2.

large as DuPont Pioneer and Monsanto suffering the consequences of economic espionage from Chinese spies.¹⁹

This Note aims to provide a background on trade secret laws and their impact on agriculture to ultimately provide insightful solutions to the growing threat of economic espionage that has emerged in recent years. The analysis will define trade secret protection, lay out the current governing laws, and detail the significance of trade secret protection in agriculture. It will also review why trade secret protection should not be overlooked, ignored, or overshadowed by other forms of intellectual property protection. Most importantly, this Note will analyze the increasingly frequent incidents of economic espionage and trade secret theft, and detail ways agriculture companies, biotechnology companies, and farmers can prevent similar occurrences in the future. This Note will conclude by reviewing the current state of trade secret laws, and what changes should be made to further prevent such theft.

II. GENERAL BACKGROUND AND SIGNIFICANCE OF TRADE SECRETS IN AGRICULTURE

It is important to analyze the definition of a trade secret in order to evaluate its significance to agriculture. Under the Uniform Trade Secrets Act (UTSA), a trade secret is defined as:

[I]nformation, including a formula, pattern, compilation, program, device, method, technique, or process, that: (i) Derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means by, other persons who can obtain economic value from its disclosure or use, and (ii) is the subject of efforts that are reasonable under the circumstances to maintain its secrecy.²⁰

These elements must continue to exist for the trade secret to continue to exist.²¹ For example, consider a business that has a secret formula, recipe, method, or technique for how to make a product sold to consumers. If the formula is not stored securely, or if everyone has access to it, then it would no longer qualify as

19. Marc S. Reisch, *Ex-Monsanto Scientist Indicted for Trade Secret Theft*, CHEM. & ENG'G NEWS (Nov. 27, 2019), <https://cen.acs.org/food/agriculture/Ex-Monsanto-scientist-indicted-trade-secret-theft/97/web/2019/11> [<https://perma.cc/Z2J5-YPLP>].

20. UNIF. TR. SECRETS ACT § 1(4) (UNIF. L. COMM'N 1985).

21. *Trade Secrets/Regulatory Data Protection*, U.S. PAT. & TRADEMARK OFF. (Sept. 4, 2024, 11:20 AM), <https://www.uspto.gov/ip-policy/trade-secret-policy> [<https://perma.cc/A9WX-Z6NA>].

a trade secret.²² Trade secret protection is unique from other forms of intellectual property protection in that registration is not required, and they have the potential to last forever.²³

Copyright protects original works of authorship that are fixed in a tangible medium, or in other words, creative expression.²⁴ Trademarks protect words, phrases, symbols, designs etc. that serve as signals or source identifiers of a business's goods or services to consumers.²⁵ In its simplest terms, patent protection gives an inventor the exclusive right to make, use, offer for sale, and sell an invention.²⁶ Agriculture companies use each of these forms of intellectual property protection, but depending on the business, product, or service, some forms of protection are more important than others.²⁷ For agriculture companies, copyright and trademark protection may carry great value, but patents and trade secrets ultimately allow them to profit from their inventions and gain an economic advantage over their competitors.²⁸

Based on the UTSA definition, there are countless opportunities for trade secret protection to apply to agriculture companies.²⁹ An agriculture company may opt for trade secret protection on unique products or processes ranging from farming equipment to genetically modified seeds.³⁰ This form of intellectual property protection is especially useful for protecting proprietary information such as internal methods, procedures, or techniques used in plant breeding.³¹ Trade secrets are incredibly valuable, considering they have the capacity to last in perpetuity.³² If the company or farmer believes they can take reasonable steps to protect the information and prevent disclosure, a trade secret may hold more value

22. *See id.*

23. *Trade Secrets*, *supra* note 1.

24. *Copyright Basics*, U.S. PAT. & TRADEMARK OFF. (Oct. 1, 2024, 12:30 PM), <https://www.uspto.gov/ip-policy/copyright-policy/copyright-basics> [<https://perma.cc/GAH2-4ZDD>].

25. *What is a Trademark?*, U.S. PAT. & TRADEMARK OFF. (Oct. 29, 2024, 10:16 AM), <https://www.uspto.gov/trademarks/basics/what-trademark> [<https://perma.cc/Y9WL-WELY>].

26. *Patent Essentials*, U.S. PAT. & TRADEMARK OFF. (Sept. 4, 2024, 11:24 AM), <https://www.uspto.gov/patents/basics/essentials> [<https://perma.cc/HLR8-KJDY>].

27. *How to Protect Your Intellectual Property in the Highly Competitive, and Highly Essential, Field of Agriculture*, *supra* note 2.

28. *See id.*

29. *See* UNIF. TR. SECRETS ACT § 1(4) (UNIF. L. COMM'N 1985).

30. *See* AGRICULTURAL ECONOMIC ESPIONAGE, *supra* note 5, at 2.

31. *How to Protect Your Intellectual Property in the Highly Competitive, and Highly Essential, Field of Agriculture*, *supra* note 2.

32. *Trade Secrets*, *supra* note 1.

than a patent, which only lasts 20 years from the filing date.³³ Further, there is not a novelty requirement for trade secrets, unlike patent protection which requires the disclosed invention to be “new.”³⁴ Patents may be used to protect the physical aspects of machinery or the physical plant itself, but trade secrets may be used to protect the specific techniques and processes used in production.³⁵ For instance, the selection and breeding of different plants or the production and processing of crops are two examples of things that can be protected as a trade secret.³⁶

Although it may not be apparent, farmers are in possession of subject matter that may qualify as a trade secret. For example, farmers hold agronomic data that they use to maximize efficiency for growing crops in each individual field.³⁷ This data is better suited for trade secret protection than utility patent, trademark, or copyright protection, based on the definitions provided by the UTSA.³⁸ Farmers should recognize that they may be in possession of material that constitutes intellectual property, which can be protected and used to their economic advantage.³⁹ However, while trade secret protection has benefits that are not afforded by other forms of intellectual property protection, farmers should be on the lookout for misappropriation in the form of economic espionage.⁴⁰

In order to examine the effects of trade secret theft in agriculture, it is critical to understand the current state of trade secret law. There are essentially three sources of trade secret law: common law, the UTSA, and the Federal Defend Trade Secrets Act (DTSA).⁴¹ Additionally, the Economic Espionage Act of 1996, while not an official source of trade secret law, criminalizes trade secret theft.⁴² Almost all states, with the exception of North Carolina and New York, have adopted their own version of the UTSA.⁴³ The UTSA governs state law civil trade secret claims and allows a trade secret owner to take legal action and obtain damages or injunctive relief when misappropriation occurs.⁴⁴

33. See ZIRPOLI, *supra* note 6, at 1.

34. See *id.*; *Patent Essentials*, *supra* note 26.

35. See *How to Protect Your Intellectual Property in the Highly Competitive, and Highly Essential, Field of Agriculture*, *supra* note 2.

36. *Id.*

37. Janzen, *supra* note 3.

38. *Id.*

39. AGRICULTURAL ECONOMIC ESPIONAGE, *supra* note 5, at 2.

40. See generally *id.*

41. *Trade Secret Law*, GEO. WASH. U. (Sept. 4, 2024, 11:19 AM), <https://law.gwu.libguides.com/tradesecrets/primary> [<https://perma.cc/5YQV-DVFZ>].

42. *Id.*

43. ZIRPOLI, *supra* note 6, at 1.

44. *Id.*

The DTSA was passed in 2016 and allows a trade secret owner to file a misappropriation claim in federal court if a product used in interstate or foreign commerce is related to the trade secret.⁴⁵ The DTSA gives owners an assurance of protection for their secrets anywhere within the United States, but does not replace state trade secret laws under UTSA, because it only allows a plaintiff to file a misappropriation claim in state or federal court when the secret has ties to interstate commerce.⁴⁶

The misappropriation of trade secrets for foreign espionage or commercial purposes was made a federal crime under the Economic Espionage Act of 1996.⁴⁷ This Act also allows prosecution of economic espionage that results in trade secret theft and creates harsh penalties for offenders.⁴⁸ Certain misappropriation claims may also be brought to the United States International Trade Commission (ITC) under Section 337 of the Tariff Act passed in 1930.⁴⁹ A claim brought under the Tariff Act of 1930 may result in an injunction issued by the ITC, preventing the importation of products derived from stolen trade secrets that harm industry in the United States.⁵⁰

The passage of these acts show that economic espionage resulting from trade secret theft has not gone unnoticed.⁵¹ However, major events of theft occurring over the past 10 years reveal that the current state of trade secret law may need to be reevaluated, especially when looking at the increasing rates of theft in the agriculture industry.⁵² If these laws remain as is, this unique form of intellectual property protection may lose its value. In the event there is a continued threat of trade secret theft, many companies and farmers could lose incredibly valuable information.⁵³ This information may be the backbone of their entire operation and potentially cost these companies and farmers significant amounts of time and money if stolen. Further, the United States may suffer significant economic damages if these secrets are transferred to China.⁵⁴

45. *Id.*

46. *Id.* at 1–2.

47. Economic Espionage Act of 1996, 18 U.S.C. § 1831.

48. *Id.*; ZIRPOLI, *supra* note 6, at 2.

49. 19 U.S.C. § 1337; ZIRPOLI, *supra* note 6, at 2.

50. ZIRPOLI, *supra* note 6, at 2.

51. *See generally* 19 U.S.C. § 1337; 18 U.S.C. § 1831.

52. *See Trade Secrets*, *supra* note 1.

53. *See* AGRICULTURAL ECONOMIC ESPIONAGE, *supra* note 5, at 2.

54. Press Release, U.S. Dep't of Just., Chinese Nat'l Sentenced for Econ. Espionage Conspiracy (Apr. 7, 2022), <https://www.justice.gov/opa/pr/chinese-national-sentenced-economic-espionage-conspiracy> [<https://perma.cc/3LFB-EJ6V>].

The laws governing trade secret claims are rather clear. In general, a plaintiff must prove three elements to establish a trade secret claim.⁵⁵ First, the subject matter must qualify for trade secret protection.⁵⁶ Second, the trade secret owner must show they took reasonable precautions to protect and prevent disclosure of the subject matter.⁵⁷ Third, the trade secret owner must prove that the subject matter was misappropriated.⁵⁸ However, certain situations allow for the lawful use of another's trade secret.⁵⁹ One of the most common examples of lawful use occurs when the trade secret is acquired through independent discovery or reverse engineering.⁶⁰

Misappropriation of trade secrets generally occurs when an individual or entity wrongfully obtains the information without the owner's consent and uses it to their own benefit.⁶¹ Under the federal DTSA, misappropriation can essentially occur six different ways.⁶² First, a misappropriation occurs when someone acquires a trade secret that they knew or have reason to know was acquired by improper means.⁶³ Second, it includes disclosing or using a trade secret of another by a person who used improper means to acquire the trade secret.⁶⁴ Third, disclosing or using a trade secret of another by a person who knew or had reason to know the information was "derived from or through a person who had used improper means to acquire the trade secret."⁶⁵ Fourth, disclosing or using a trade secret by a person who knew or had reason to know the information was "acquired under circumstances giving rise to a duty to maintain the secrecy of the trade secret" or limit its use.⁶⁶ The fifth is similar to the fourth except that at the time of disclosure or use, the person knows the trade secret is "derived from or through a person who owed a duty . . . to maintain the secrecy of the trade secret[.]" Finally, the sixth form of misappropriation occurs when "before a material change of the position of

55. *Trade Secret*, LEGAL INFO. INST., CORNELL L. SCH. (Sept. 4, 2024, 11:22 AM), https://www.law.cornell.edu/wex/trade_secret [https://perma.cc/2K2D-VBU8].

56. *Id.*

57. *Id.*

58. *Id.*

59. *Trade Secrets*, *supra* note 1.

60. *Id.*

61. *Theft of Trade Secrets*, EISNER GORIN LLP (Sept. 4, 2024, 11:25 AM), <https://www.thefederalcriminalattorneys.com/federal-theft-of-trade-secrets> [https://perma.cc/TZK3-PMH4].

62. Defend Trade Secrets Act of 2016, 18 U.S.C. § 1836; *see* 18 U.S.C. § 1839(5).

63. 18 U.S.C. § 1839(5)(A).

64. *Id.* § 1839(5)(B)(i).

65. *Id.* § 1839(5)(B)(ii)(I).

66. *Id.* § 1839(5)(B)(ii)(II).

the person, [they] knew or had reason to know” that the information was a trade secret and that it had been “acquired by accident or mistake.”⁶⁷

However, misappropriation does not occur if someone discovers a trade secret through legitimate means and proceeds to use the secret to their benefit.⁶⁸ For example, reverse engineering may occur if someone has possession of a product and they are able to legitimately deconstruct and understand the composition of that product.⁶⁹ Independent discovery occurs when someone is working on a similar problem and comes up with the same solution without help from the original owner or his employees.⁷⁰ This is where a patent may be particularly favorable to companies or farmers.⁷¹ While a patent expires 20 years after the filing date, a patent protects against independent discovery and reverse engineering during that period by giving the owner exclusive rights to prevent others from making, using, or selling the invention.⁷² Trade secrets may be vulnerable in this regard, but patents generally have more limitations on what subject matter qualifies for protection.⁷³ Additionally, a patent requires public disclosure and will expire after 20 years, but a trade secret has the potential to last forever, provided the owner takes the necessary steps and precautions to prevent disclosure to the public.⁷⁴

Agriculture companies commonly opt for trade secret protection for internal methods, procedures, or techniques to produce plant propagation.⁷⁵ As previously noted, anything that gives the company an economic advantage by not being generally known can be protected through a trade secret.⁷⁶ Trade secret protection may also be favorable in a situation where public disclosure of the product, recipe, method, etc. is not desired and that information cannot be easily reverse engineered.⁷⁷ However, if a farmer or corporation invents a new product that they wish to commercialize, and that product has the capacity to be reverse engineered, then a patent would be more favorable in this situation because they would at least

67. *Id.* § 1839(5)(B)(iii).

68. *Trade Secrets*, *supra* note 1.

69. *See* *Kewanee v. Bicon*, 416 U.S. 470, 476 (1974).

70. *Trade Secrets*, *supra* note 1.

71. *See Frequently Asked Questions: Trade Secrets*, *supra* note 12.

72. *Trade Secrets/Regulatory Data Protection*, *supra* note 21.

73. *Id.*

74. ZIRPOLI, *supra* note 6, at 1.

75. *How to Protect Your Intellectual Property in the Highly Competitive, and Highly Essential, Field of Agriculture*, *supra* note 2.

76. UNIF. TR. SECRETS ACT § 1(4) (UNIF. L. COMM’N 1985).

77. *See Frequently Asked Questions: Trade Secrets*, *supra* note 12.

gain protection for a reasonable amount of time.⁷⁸ In other words, if public disclosure is inevitable due to commercial interest, and reverse engineering is likely, patent protection is advantageous.⁷⁹ Internal methods, on the other hand, as well as techniques and procedures that happen behind closed doors, are far better suited for trade secret protection.⁸⁰

III. THREATS AND RAMIFICATIONS OF ECONOMIC ESPIONAGE AND TRADE SECRET THEFT

A number of recent incidents have not only shined a light on the delicacy of trade secret protection, but have also weakened its reputation in the agriculture industry.⁸¹ Investigations conducted by the Federal Bureau of Investigation (FBI) have revealed a rise in economic espionage and trade secret theft against United States agriculture and biotechnology companies.⁸² Businesses, universities, and government research facilities in the United States have been targeted by foreign individuals attempting to collect and steal agricultural information.⁸³ This information includes, but is not limited to, plant genomes, breeding programs, and advanced manufacturing processes.⁸⁴ Those who steal intellectual property are generally a commercial rival, start-up company, spy, disgruntled employee, or organized criminal.⁸⁵

Recent cases of agricultural economic espionage have involved Chinese spies infiltrating large agriculture and biotechnology companies to steal trade secret information surrounding seeds.⁸⁶ Other cases involve outright theft of valuable information from agricultural companies.⁸⁷ For instance, in 2013, a Chinese national by the name of Mo Hailong infiltrated DuPont Pioneer test fields

78. *Id.*

79. *Id.*

80. *How to Protect Your Intellectual Property in the Highly Competitive, and Highly Essential, Field of Agriculture*, *supra* note 2.

81. *See* Chinese Nat'l Sentenced for Econ. Espionage Conspiracy, *supra* note 54; Press Release, U.S. Dep't of Just., Chinese Nat'l Sentenced to Prison for Conspiracy to Steal Trade Secrets (Oct. 5, 2016), <https://www.justice.gov/opa/pr/chinese-national-sentenced-prison-conspiracy-steal-trade-secrets> [<https://perma.cc/Q7DG-L7KZ>].

82. AGRICULTURAL ECONOMIC ESPIONAGE, *supra* note 5, at 1.

83. *Id.*

84. *Id.*

85. *Id.* at 2.

86. *Id.*

87. *See id.*

in Illinois and Iowa to steal valuable inbred corn seeds.⁸⁸ Hailong was the Director of International Business at a Beijing conglomerate with a corn seed subsidiary company.⁸⁹ Security witnessed Hailong and his colleagues digging in the fields for inbred and parent line seeds, which were valuable intellectual property of DuPont Pioneer and Monsanto.⁹⁰ The conspirators then attempted to secretly transfer the inbred corn seed to China, but were arrested and sentenced to 36 months in prison for conspiracy to steal trade secrets.⁹¹ Hailong admitted in his plea agreement to being a participant in a long-term conspiracy to steal trade secrets from both DuPont Pioneer and Monsanto.⁹²

Another case in 2017 involved a Chinese citizen by the name of Haitao Xiang stealing predictive algorithms from Monsanto.⁹³ Xiang was a Monsanto researcher who downloaded the platform containing the predictive algorithms on a micro-SD card, then attempted to get on a one-way flight back to China before he was stopped by federal officials.⁹⁴ The algorithms were associated with a platform that advised farmers on ways they could improve crop growth.⁹⁵ Xiang was sentenced to 29 months in prison for conspiring to commit economic espionage.⁹⁶ The Assistant Attorney General for National Security, John C. Demers, noted this case demonstrated another example of the Chinese government using recruitment tools to encourage employees to steal intellectual property from American employers.⁹⁷

This is a recurring event with many other cases of theft involving Chinese nationals or citizens transpiring in recent years. In 2011, Kexue Huang, a Dow Agrosciences researcher, provided stolen trade secrets from Dow and Cargill to Chinese researchers.⁹⁸ In 2018, a Chinese scientist named Weiqiang Zhang was sentenced to 10 years in prison for conspiring to steal genetically altered rice seed.⁹⁹ It is not just the agriculture industry being affected by intellectual property theft either. In 2021, a Chinese national was convicted by a federal jury of conspiring to and attempting to commit economic espionage and trade secret theft

88. Chinese Nat'l Sentenced to Prison for Conspiracy to Steal Trade Secrets, *supra* note 81.

89. *Id.*

90. *Id.*

91. *Id.*

92. *Id.*

93. Reisch, *supra* note 19.

94. *Id.*

95. *Id.*

96. Chinese Nat'l Sentenced for Econ. Espionage Conspiracy, *supra* note 54.

97. Reisch, *supra* note 19.

98. *Id.*

99. *Id.*

against industry-leading American aviation technology companies.¹⁰⁰ These examples detail a few of the many instances where conspirators were caught and found guilty. It is likely that other cases of theft are going unnoticed by the FBI, allowing companies' trade secrets to be stolen without repercussion.

China's interest in United States' agriculture is reasonable.¹⁰¹ China is one of the most populous countries in the world, with a population exceeding 1.4 billion.¹⁰² Thus, finding ways to feed their people is a central issue for the Chinese government year after year.¹⁰³ A 2021 report from the United States Embassy in Beijing detailed how China is focusing on the growing need to become skilled in the commercialization of seeds and livestock genetics.¹⁰⁴ Unfortunately, as the aforementioned cases indicate, China has been employing unethical means to develop intellectual property of its own to address these issues.¹⁰⁵

Economic espionage and trade secret theft leads to many ramifications for American agriculture companies, including the potential to damage a company's reputation.¹⁰⁶ When confidential information relating to proprietary techniques, methods, or procedures is stolen, companies suffer in the form of lost revenue, lost employment, interruptions in production, and lost investment in research and development.¹⁰⁷ In developing information that qualifies for trade secret protection, corporations invest many years and large amounts of money, sometimes millions of dollars, into developing the proprietary information.¹⁰⁸ This outright theft also exposes weaknesses in the United States' national economic

100. Press Release, U.S. Dep't of Just., Jury Convicts Chinese Intel. Officer of Espionage Crimes, Attempting to Steal Trade Secrets (Nov. 5, 2021), <https://www.justice.gov/opa/pr/jury-convicts-chinese-intelligence-officer-espionage-crimes-attempting-steal-trade-secrets> [<https://perma.cc/4HJ8-R88P>].

101. See Christopher Burgess, *China Theft of US Agriculture Sector Trade Secrets Prompts Government Guidance*, CSO ONLINE (Sept. 2, 2021), <https://www.csoonline.com/article/571243/china-theft-of-us-agriculture-sector-trade-secrets-prompts-government-guidance.html> [<https://perma.cc/P4N6-EVRL>].

102. *People's Republic of China*, DATA COMMONS (Sept. 24, 2024, 4:41 PM), <https://datacommons.org/place/country/CHN?category=Demographics> [<https://perma.cc/Q3X8-CE3T>].

103. Burgess, *supra* note 101.

104. *Id.*

105. See AGRICULTURAL ECONOMIC ESPIONAGE, *supra* note 5, at 1–2; Jury Convicts Chinese Intel. Officer of Espionage Crimes, Attempting to Steal Trade Secrets, *supra* note 100.

106. AGRICULTURAL ECONOMIC ESPIONAGE, *supra* note 5, at 2.

107. *Id.*

108. See Chinese Nat'l Sentenced to Prison for Conspiracy to Steal Trade Secrets, *supra* note 81.

security to the rest of the world.¹⁰⁹ Other nations, who do not want to invest the time and money into developing new processes or methods that advance agriculture, may resort to China's strategy of economic espionage.

According to the trade group CropLife International who represents the plant science industry, it can take up to 10 years and \$250 million dollars to bring a new product to market.¹¹⁰ Trade secrets protect valuable information relating to a company's products and services, and are closely guarded due to the time and cost of developing new products.¹¹¹ After the DuPont Pioneer incident, the company emphasized its reliance on intellectual property protection and noted that decades of work, research, and development leads to a range of intellectual property from patents to trade secrets.¹¹² When a company such as DuPont Pioneer falls victim to economic espionage, many years of work and substantial financial resources are lost.¹¹³

Some Iowa farmers have expressed their concerns about foreign theft as well.¹¹⁴ Suzanne Shirbourn, an Eastern Iowa farmer and Iowa Soybean Association President, emphasized her worries to the United States House Select Committee on Strategic Competition between the United States and the Chinese Communist Party.¹¹⁵ She stressed that substantial amounts of time and money are lost when entities wrongfully misappropriate sensitive information.¹¹⁶ While she has not physically witnessed theft, she believes that recent cases of economic espionage may be directly correlated to the economic losses several farmers are experiencing, as input prices for farmers continue to rise.¹¹⁷

109. *Id.*

110. Christopher Doering, *U.S. Senate Overwhelmingly Passes Trade Secrets Bill*, DES MOINES REG. (Apr. 5, 2016, 4:48 PM), <https://www.desmoinesregister.com/story/money/2016/04/05/us-senate-overwhelmingly-passes-trade-secrets-bill/82664882/> [<https://perma.cc/9PGB-JJ2T>].

111. *Id.*

112. *Id.*

113. *See id.*

114. Brian Tabick, *Farmers Bring Their Concerns Over China's Intellectual Property Theft to US House Committee*, KCRG (Aug. 3, 2023, 10:30 PM), <https://www.kcrg.com/2023/08/04/farmers-bring-their-concerns-over-chinas-intellectual-property-theft-us-house-committee/> [<https://perma.cc/3GL9-7A5M>].

115. *Id.*

116. *Id.*

117. *Id.*

China buys approximately 30% of the soybeans produced in the United States, making them the largest importer of soybeans in the world.¹¹⁸ By stealing proprietary intellectual property, China may be able to circumvent the high costs and decades of research and development required for stable soybean production, and eventually become self-reliant.¹¹⁹ Shirbourn explained how losing Chinese business would result in a tremendous blow to soybean sales in the United States given their status as America's number one purchaser.¹²⁰

IV. EXISTING APPROACHES TO PROTECTING TRADE SECRET INFORMATION

American companies currently employ a wide variety of practices to protect trade secret information.¹²¹ Many of these practices are the result of judicial decisions that outline what constitutes reasonable protection for different types of businesses and trade secret owners.¹²² The term "reasonable measures," as it appears in the federal statute, has been interpreted many ways, and there is no bright-line rule for reasonableness.¹²³ Reasonable measures of protection for a sole proprietor look much different than the measures of protection employed by a Fortune 500 company.¹²⁴ This is a fact-specific question based on the circumstances surrounding each company; determining whether reasonable measures have been taken is very much a sliding scale.¹²⁵ Larger companies are generally expected to invest more time, money, and resources into protecting their confidential information, while smaller start-ups or sole proprietorships may be given more leeway.¹²⁶

Common approaches for safeguarding agricultural intellectual property and trade secret information include proper employee education/training, making use of non-disclosure agreements, utilizing password protection, and having up-to-date software security systems.¹²⁷ Before any of these steps are taken, however, it is

118. *Id.*; *Soybeans*, OBSERVATORY OF ECON. COMPLEXITY (Oct. 30, 2024, 4:38 PM), <https://oec.world/en/profile/hs/soybeans> [<https://perma.cc/8GLY-L58B>].

119. *See generally* Tabick, *supra* note 114.

120. *Id.*

121. *Trade Secrets*, *supra* note 1; AGRICULTURAL ECONOMIC ESPIONAGE, *supra* note 5, at 2.

122. 'Reasonable Measures' for Protecting Trade Secrets: A Primer, WINSTON & STRAWN LLP (Feb. 27, 2019), <https://www.winston.com/en/insights-news/reasonable-measures-for-protecting-trade-secrets-a-primer> [<https://perma.cc/AJ59-6VQW>].

123. *Id.*

124. *Id.*

125. *Id.*

126. *Id.*

127. *See id.*; AGRICULTURAL ECONOMIC ESPIONAGE, *supra* note 5, at 2.

critical to identify what information constitutes a company trade secret under the UTSA.¹²⁸ Any information that is proprietary, confidential, or has the capacity to reveal classified information should be identified and marked accordingly, especially when it will be delivered in some way.¹²⁹ When visitors are at a corporate location, they should be monitored to ensure they are not stumbling upon, or gaining access to, confidential information.¹³⁰

It is also important to disclose trade secret information to carefully selected, and predictably very few, employees.¹³¹ This practice may be critical in solving the issue of trade secret theft in agriculture. If the employees in the DuPont Pioneer and Monsanto cases would not have known important information pertaining to company trade secrets, it is probable these corporations would not have fallen victim to economic espionage. If the employees who stole information would not have had access to the information, or had limited access, it is likely the risk of theft could have been mitigated.¹³²

Two of the most famous examples related to safeguarding trade secrets include the techniques employed by Coca-Cola and Kentucky Fried Chicken (KFC).¹³³ It is rumored that only one Coca-Cola employee knows half of the recipe, and another employee knows the other half.¹³⁴ KFC applies similar measures of protection in that only a few employees know the original recipe and they are bound by strict confidentiality agreements.¹³⁵ Further, KFC has two separate companies blend the mixtures for the batter to add another layer of confidentiality.¹³⁶ The question remains, however, how can large agriculture companies protect trade secret information from foreign theft and espionage? While it is hard to compare Coca-Cola or KFC's secret formulas to the confidential information of an agriculture company, it is not absurd to recognize the measures taken to protect some of the most famous trade secrets and ask how agriculture companies can adjust their strategies for protection. Under the current state of trade secret law, agriculture companies might have to adapt and implement measures of

128. *Trade Secrets*, *supra* note 1.

129. *See* AGRICULTURAL ECONOMIC ESPIONAGE, *supra* note 5, at 2.

130. *Trade Secrets*, *supra* note 1.

131. *See id.*

132. *See* Chinese Nat'l Sentenced for Econ. Espionage Conspiracy, *supra* note 54.

133. *Trade Secrets: 10 of the Most Famous Examples*, VETHAN LAW FIRM, P.C. (Nov. 8, 2016), <https://www.vethanlaw.com/blog/2016/november/trade-secrets-10-of-the-most-famous-examples/> [<https://perma.cc/6URQ-W6UT>].

134. *Id.*

135. *Id.*

136. *Id.*

protection similar to those employed by companies such as Coca-Cola if they wish to prevent economic espionage from foreign entities.

V. IMPLICATIONS OF ECONOMIC ESPIONAGE ON TRADE SECRET LAW AND FUTURE CONSIDERATIONS

Congress has attempted to address the issue of trade secret theft by foreign entities, particularly from Chinese nationals.¹³⁷ Several bills relating to the threat of trade secret theft by non-United States citizens were considered by the 117th and 118th Congresses.¹³⁸ The Combating Chinese Purloining of Trade Secrets Act (CCP), the Stop Theft of Intellectual Property Act of 2021, the Protecting American Intellectual Property Act of 2022, and the Countering Chinese Espionage Reporting Act have all been introduced in recent years with similar goals of combating the theft of intellectual property from American companies.¹³⁹ Some of these bills would have introduced immigration penalties against violators and sanctions against foreign entities that misappropriate trade secrets.¹⁴⁰

For example, non-United States citizens or nationals would have been rendered inadmissible and deportable for violating the Economic Espionage Act had the CCP and the Stop Theft of Intellectual Property Acts been passed.¹⁴¹ The CCP, along with the Protecting American Intellectual Property Act of 2022, were introduced with the objective of penalizing foreign entities by imposing sanctions and trade restrictions on any foreign entity that engages in trade secret misappropriation.¹⁴² These bills intended to make foreign entities that misappropriate trade secrets ineligible for financial assistance from the United States.¹⁴³ Additionally, the Countering Chinese Espionage Reporting Act and the CCP would have required the Attorney General to report annually on efforts made to counter Chinese espionage and trade secret theft.¹⁴⁴ The Protecting American Intellectual Property Act of 2022 was the only bill of the four that was signed into

137. ZIRPOLI, *supra* note 6, at 2.

138. *Id.* at 1.

139. *Id.* at 2.

140. *See, e.g.*, Stop Theft of Intellectual Property Act of 2021, S. 1409, 117th Cong. (2021).

141. S. 1409; ZIRPOLI, *supra* note 6, at 1.

142. ZIRPOLI, *supra* note 6, at 1; *see* Protecting American Intellectual Property Act of 2022, 50 U.S.C. § 1709.

143. ZIRPOLI, *supra* note 6, at 2.

144. *Id.*

law.¹⁴⁵ Under the Act, those who engage in, support, or benefit from trade secret theft may be denied or revoked visas and United States entry.¹⁴⁶

Each of these bills would have made progress towards mitigating economic espionage and the resulting negative effects. Individuals who are encouraged by foreign governments to steal trade secrets might reevaluate their actions if there is a possibility of deportation. Foreign entities also might reconsider incentivizing trade secret theft if there is a threat of sanctions and loss of funding from the United States. Unfortunately, most of these bills did not come to fruition, leaving American companies forced to depend on current trade secret laws and penalties to deter criminal acts.¹⁴⁷

The current penalties for criminal trade secret theft, however, are very serious.¹⁴⁸ Theft of trade secrets and the associated penalties is governed by 18 U.S.C. § 1832.¹⁴⁹ Individuals can be sentenced up to 10 years in federal prison for stealing a trade secret or receiving a trade secret with the knowledge it was unlawfully obtained.¹⁵⁰ Monetary penalties for trade secret theft are also severe and can be imposed in addition to a prison sentence.¹⁵¹ If an organization engages in trade secret theft, they can “be fined up to \$5,000,000 or three times the value of the trade secrets in question, whichever is greater.”¹⁵² This is an appropriate penalty considering some trade secrets can be worth billions of dollars.¹⁵³ The ultimate goal of these penalties is to deter criminal conduct on behalf of business competitors of American companies.¹⁵⁴

However, current penalties are clearly not deterring criminal conduct and economic espionage.¹⁵⁵ It has been documented that the Chinese Government is incentivizing Chinese citizens to infiltrate American companies with the ultimate goal of stealing confidential information to take back to China.¹⁵⁶ It is unlikely that

145. See 50 U.S.C. § 1709.

146. See *id.* § 1709(b)(2)(B); ZIRPOLI, *supra* note 6, at 1.

147. See CCP Act, H.R. 1081, 118th Cong. (2023); Stop Theft of Intellectual Property Act of 2021, S. 1409, 117th Cong. (2021); Countering Chinese Espionage Reporting Act, H.R. 5404, 118th Cong. (2023).

148. See *Theft of Trade Secrets*, *supra* note 61.

149. See *id.*; 18 U.S.C. § 1832.

150. *Theft of Trade Secrets*, *supra* note 61.

151. *Id.*

152. *Id.*

153. See *id.*

154. *Id.*

155. See AGRICULTURAL ECONOMIC ESPIONAGE, *supra* note 5, at 1–2.

156. Reisch, *supra* note 19.

current penalties, which are primarily directed towards business competitors, have the same deterring effect on a government entity as large and powerful as China.¹⁵⁷ Congress should continue to consider harsher penalties for those who misappropriate trade secrets from American companies and take additional steps to mitigate theft and espionage. But until then, it is ultimately up to corporations to adopt strict security systems and procedures. Doing so will help ensure protection of confidential and proprietary information.¹⁵⁸

As trade secrets are one of the most ignored forms of intellectual property, smaller companies may not even know the risks of economic espionage, or how to protect their confidential information.¹⁵⁹ One of the most important things that can be done to mitigate future instances of trade secret theft is educating United States agriculture companies on the growing risks of theft and prior cases of misappropriation.¹⁶⁰ Considering the history of targeted foreign economic espionage on agriculture companies in the last decade, the first and most important step that should be taken is educating corporations and their employees on prior cases of theft, the possibility of theft in the future, and what information they possess that could be a target of theft.¹⁶¹ This is particularly important for smaller companies and start-ups, as they do not have the level of security and resources large companies have.¹⁶² Smaller companies, as well as universities and higher institutes of learning, are also looking for funding and are normally willing to disclose more information than a large corporation.¹⁶³

Until Congress is able to pass a bill that further combats trade secret theft and imposes harsher penalties, agriculture companies will need to take matters into their own hands. Additionally, if farmers begin to take advantage of trade secret protection for their proprietary methods, techniques, or data, and it becomes more difficult to steal information from large companies, spies may begin to target smaller operations. In these situations, it is essential to educate farmers and smaller farming operations on effective strategies to protect their intellectual property until further legislation is passed that provides adequate protection to businesses.

157. See 18 U.S.C. § 1832(b).

158. See *Trade Secrets*, supra note 1.

159. *Id.*

160. See AGRICULTURAL ECONOMIC ESPIONAGE, supra note 5, at 1–2.

161. *Id.*; *Trade Secrets*, supra note 1.

162. *Trade Secrets*, supra note 1.

163. *Id.*

VI. CONCLUSION

Intellectual property, including trade secrets, are among a company's most valuable assets.¹⁶⁴ Intellectual property provides the foundation for businesses to profit from their investments in research and development, which in turn directly promotes the innovation and creation of new products.¹⁶⁵ Misappropriation of trade secret information can have detrimental effects on American businesses, a concerning reality given the rise of economic espionage against American agriculture companies.¹⁶⁶ It is imperative that Congress further addresses this issue to prevent future cases of theft and mitigate the negative ramifications of misappropriation.

However, harsher penalties and stricter laws will not entirely eliminate this issue, so it is ultimately up to American agriculture and biotechnology companies to ensure their valuable information is not at risk. Educating employees and implementing strict, proven measures of protection are two of the most important steps a business can take to avert theft from foreign entities. Agriculture companies must become well-informed and cautious about attacks on intellectual property before this threat becomes an irreversible phenomenon in American agriculture.

164. David Atallah & Alessandro Spina, *Fostering a Corporate Culture That Embraces Trade Secret Protection*, AM. BAR ASS'N (Dec. 20, 2022), https://www.americanbar.org/groups/intellectual_property_law/publications/landslide/2022-23/december-january/fostering-corporate-culture-embraces-trade-secret-protection/.

165. *Id.*

166. See AGRICULTURAL ECONOMIC ESPIONAGE, *supra* note 5, at 1.