



# Soybean Trade Report: Trend and Risk Analysis

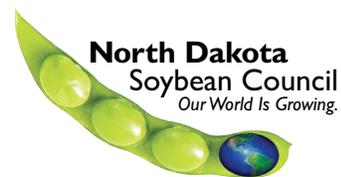
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**NDSU** NORTH DAKOTA  
STATE UNIVERSITY

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## Acknowledgments

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# Contents

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Glossary .....	4
Executive Summary.....	5
About the Center .....	6
About the North Dakota Soybean Council.....	7
Trade Report .....	8
Section I: Global Temporal Soybean Trade.....	11
Section II: Global Spatial Soybean Export.....	17
Section III: Global Spatial Soybean Import.....	27
Section IV: U.S. Temporal Soybean Export.....	37
Section V: U.S. Spatial Soybean Export.....	39
Section VI: U.S. State Level Soybean Export.....	49

# Glossary

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<b>Average/mean</b>	This is the sum of a collection of numbers divided by the count of numbers in the collection. For past historical data as in this report, this gives an idea of what the producer or decision maker should expect.
<b>Coefficient of variation</b>	This is also known as the relative standard deviation. It is a statistical measure of the dispersion of data points around the mean. While it performs a similar function to the standard deviation, it is advantageous because it can be used to compare dispersion of data between distinct series of data. Furthermore, it is a unitless measure. Generally, a decision maker seeks a lower value because it provides an optimal risk-to-reward ratio with low volatility but high returns.
<b>Descriptive statistics</b>	These are brief descriptive coefficients that summarize given data sets. These are classified into the measures of central tendency (mean/average) and measures of variability (minimum, variance/standard deviation and maximum variables).
<b>Ex-ante</b>	These are inferences based on forecasts.
<b>Export</b>	Goods or services that are sent out of a specific geographical location to another spatially demarcated jurisdiction. This is represented as nominal dollars.
<b>Ex-post</b>	These are inferences based on actual results.
<b>Harmonized system code</b>	Commonly represented as harmonized system (HS) code. This is a standardized numerical method of classifying traded products. Primarily, it is used by customs authorities around the world to identify products when assessing duties/taxes and for collecting data for statistical analysis.
<b>Import</b>	Goods or services that are brought into a specific geographical location from another spatially demarcated jurisdiction. This is represented as nominal dollars.
<b>Net farm income</b>	Net farm income refers to the return to farm operators for their labor, management and capital after all production expenses have been paid. This is the gross farm income minus production expenses.
<b>Period</b>	A period is defined as a five-year interval in this report.
<b>Prices</b>	Price is computed as the ratio of export value and quantity. This is represented as nominal dollars per metric ton (\$/MT).
<b>Production efficiency</b>	Production efficiency is concerned with producing goods and services with the optimal combination of inputs to produce maximum output for the minimum cost.
<b>Production</b>	Quantity of commodity produced. This is measured as bushels for both commodities (corn and soybeans).
<b>Productivity</b>	Productivity is the measure of output from a production process per unit of input.
<b>Risk</b>	A risk is the possibility of loss or gain of an event with known probabilities.
<b>Shares</b>	Representative proportion of the total of a variable/indicator.
<b>Standard deviation</b>	This is a quantification of the amount of variation or dispersion of a set of data values. This is most often a complementary information to the mean. Given any mean, there are chances of gain or a loss. Hence, knowing the possible variation can allow the decision maker or producer to plan with bounds.
<b>Trade</b>	This is basically computed as the sum of imports and exports. However, in this report, trade is used generically to represent either imports or exports.
<b>Trend</b>	A general course or prevailing tendency to take a particular direction or move in some indicated direction. In this report, the trend defines the direction of growth of the respective variable.
<b>Uncertainty</b>	Uncertainty refers to the occurrence of an event for which probabilities cannot be assigned.

# Executive Summary

This report presents organized and structured information on soybean trade indicators across geographical space and through time. The indicators considered are exports, imports and prices. These also are presented at the byproduct level.

The levels of aggregation are global, U.S. and North Dakota. The information is presented in the form of trends and descriptive statistics. The former reveals the direction of the growth, while the latter reveals the magnitude of expectations. The descriptive statistics are represented by the mean, standard deviation, coefficient of variation and share contribution to the total.

The report is presented in six sections: (I) global temporal soybean trade, (II) global spatial soybean export, (III) global spatial soybean import, (IV) U.S. temporal soybean export, (V) U.S. spatial soybean export and (VI) U.S. state level soybean export. At the global level, the trends of the indicators are presented in addition to the descriptive statistics of the top 15 exporting and importing countries. The trends and descriptive statistics for the top 15 exporting states also are provided at the U.S. level.

This report is important because it serves as an informational guide on exports, our competitors for exports and potential markets for soybeans to our producers. In the current environment, the success (productivity and net farm income stability) of agricultural business depends on accurate prediction of potential demand for soybeans and their products to help producers in making decisions for domestic or foreign markets. Hence, having a comprehensive and accurate database on exports and imports at the global, national and state levels will enable producers in decision-making with confidence.

To formulate trade policies related to the international market, the trends and the descriptive statistics are useful to producers in identifying variations in demand for soybeans and their products. For decision makers, this information is helpful in the development of risk management tools for potential export losses due to risky events such as politically driven tariffs and uncertain events such as COVID-19. Finally, in the years of decline, identifying sources of variation or risk in changing consumer preferences, genetically modified restrictive index, trade facilitation and prosperity indexes is important. The study reveals that:

## Global Trade

- The soybean market has shifted to processed products.
- Soybean grain, residue and crude oil are primary with an increase in flour.
- Brazil, Argentina, Paraguay and Canada are the major competitors with the U.S. for soybean grains.
- China, Japan, Netherlands, Spain and Germany are the major destinations for soybean grain.
- Soybean grain prices have been on the decline in recent years.

## U.S. Trade

- China, Mexico, Japan, Indonesia and Netherlands are the major destinations for U.S. soybean grains.
- Turkey, Russia, Argentina and Italy are among the top 15 importers of soybean grains but not part of the top 15 U.S. export destinations.

## U.S. State Trade

- Our state-level estimates of trade are consistent with U.S. Department of Agriculture (USDA) Economic Research Service (ERS) exports. In contrast, the USDA Foreign Agricultural Service (FAS) under- and overestimates state exports because they are based on the location of the port.
- Our production-adjusted state export estimates suggest the major exporters of soybeans are Illinois, Iowa, Minnesota, Nebraska, Indiana, Ohio, Missouri, South Dakota, North Dakota and Kansas.

## North Dakota Trade

- North Dakota soybean exports are underestimated by the USDA FAS.
  - For instance, the production adjusted export value predicts a value of \$885,365,842 in 2018, while the ERS method predicted \$887,896,380 for North Dakota. On the other hand, the FAS presents a value of \$62,543,314.

## Future Research

Exports are particularly important for every economy. In the case of North Dakota, where production mostly exceeds domestic consumption, the need to explore foreign market potentials is essential. From this report, we observed that the current trends of soybean trade for North Dakota have been increasing. We must not only evaluate the determinants of North Dakota soybean exports but also explore potential markets.

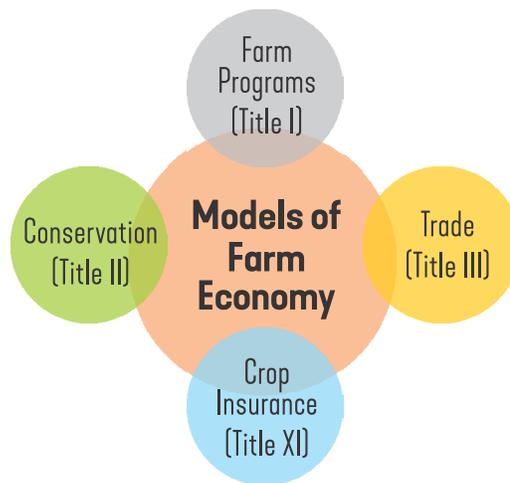
- The next stage of this research seeks to evaluate the efficiency of U.S. state agricultural exports and its determinants. Of particular interest are the impact of the genetically modified restrictive index, tariffs and other transportation costs. The expected outcome of the estimation is to provide the requisite knowledge that will give North Dakota soybean farmers a comparative advantage in the international markets, given that these variables have become very instrumental drivers of international trade in recent years.
- The second objective will be to examine the determinants of commodity price volatilities and their impact on North Dakota production and exports.

# About the Center

## Center for Agricultural Policy and Trade Studies

The vision of the Center for Agricultural Policy and Trade Studies (CAPTS) is to enhance the sustainability of the net farm income of North Dakota producers through in-depth trade and agricultural policy research. After carefully considering stakeholder inputs, interests, risks and uncertainties, the concept of efficiency, technology assessment and productivity growth<sup>1</sup> also are embedded into the center's research.

To address this vision, the center aims to develop a “*model of farm economy*” to conduct ex-post and ex-ante evaluations for North Dakota. The model will evaluate agricultural and trade policies with its implications on North Dakota producers' net farm income. Additionally, the implications of policy on North Dakota producers' efficiency, technology assessment and productivity growth also will be evaluated.



The model of farm economy based on multiple theoretical frameworks will not only evaluate the implications of existing agricultural and trade policies (Title I, II, III and XI) but also future policies to meet efficiency, productivity and net farm income sustainability goals of North Dakota producers. Our perception of the challenges and the choices made at this juncture in history will determine how to protect farmers in our state and secure our future. The center keeps detailed records of all activities and publishes the information that will be of value to the clientele, including commodity groups and decision makers of the state and region.

### Center and Current Project

The center, in collaboration with North Dakota Soybean and Corn councils, is evaluating measures of improving net farm income sustainability for producers in the state. The project is in three dimensions; these are the production indicator report, trade report and policy report.

The phase 1 outcomes of the project include detailed and comprehensive development of databases and the presentation of trends and risks in the production indicator, trade and policy reports. These reports are useful to the producers, commodity groups and decision makers.

Also, this information will form the basis for the development of the “*model of farm economy*” to evaluate the implications of agricultural and trade policies on North Dakota producers' net farm income. Additionally, the implications of technology and policies on North Dakota producers' efficiency and productivity growth will be evaluated.

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<sup>1</sup> The efficiency concept allows producers to evaluate input resources (cost) to produce output (revenue). The producers' efficiency will improve through time with adoption of innovative technologies to minimize cost and maximize revenue.

# About the North Dakota Soybean Council

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The North Dakota Soybean Council (NDSC) was established in 1985 by the North Dakota Legislature. In 1991, the NDSC became a qualified state soybean board (QSSB) under the federal [Soybean Promotion, Research and Consumer Information Act](#), when the United Soybean Board (USB) was established. Today, the NDSC serves more than 10,000 soybean farmers in North Dakota.

The NDSC is charged as the administrator of the North Dakota soybean checkoff. The checkoff is one-half of 1% of the price of each bushel of soybeans contributed at the first point of sale. Fifty percent of the funds collected remains in North Dakota for initiatives in the state. The remaining 50% is sent to the USB for national programs for the betterment of U.S. soybean farmers.

The NDSC consists of a board of 12 soybean producers elected by their peers. Board members are charged with determining how to invest the soybean checkoff into programs that support and expand research, market development, promotion and education to the benefit of the North Dakota soybean producers. In addition to the 12-member board, the office is managed by a team of six professionals to help oversee the investments as directed by the board.

Soybean production in North Dakota has grown tremendously since the mid-1980s, and soybeans are grown on farm operations statewide. Thanks to the investment in research, farmers have access to varieties that do well in our northern climate.

Because of our soy checkoff investments in transportation infrastructure and market development around the globe, North Dakota soybeans are a high-value export crop. The NDSC board strives to foster and grow strong market demand in traditional and new expanding markets, invest in research to meet the changing needs of farmers each year to ensure a quality crop, and work to ensure the tools and resources are available to help farmers remain profitable.

The soybean industry is a key piece of the North Dakota economy, helping support communities, rural and urban, creating job opportunities and sustaining healthy land that has been part of North Dakota's heritage for generations.

The North Dakota Soybean Council is committed to growing a legacy of successful farmers. To learn more about the NDSC, visit [www.ndsoybean.org](http://www.ndsoybean.org), or follow it on social media.

# Trade Report

## Rationale for This Report

In recent years, discussions on global trade have become a delicate topic among world leaders. Each country seems to seek out its interest at the expense of others. However, a theoretically established fact is that international trade is a positive-sum game rather than a zero-sum game for partner countries involved. What also is well known is that governments are more likely to form free trade areas if the benefits outweigh the costs.

The U.S. has been at the center of many of these trade disputes in recent times. This can be primarily attributed to its efficiency of production. The U.S. agricultural sector consistently has produced more than its domestic needs. Hence, international trade and food aid supplies have been the two major outlets for excess agricultural produce of the U.S.

Considering this, the recent turn of geopolitical events has been unfavorable for farmers in the U.S. To remedy this issue, we have a need to understand the factors that hinder or promote U.S. agricultural exports. Several studies have been conducted on the determinants of U.S. agricultural exports. Meanwhile, crop production is spatially specialized in the U.S. For instance, the Midwestern states are the major producers of U.S. grains and oilseeds.

To formulate policies concerning current trade events, the understanding of the determinants of U.S. agricultural exports alone may not be sufficient. We have a need to dissect the determinants of state-level agricultural exports. However, research on U.S. state-level agricultural exports is limited, attributed to the nature of available data.

The current data on state-level exports do not reflect the major production states. This is because of the dual problem of the absence of ports of exit in these states and the USDA Foreign Agricultural Service's method of reporting state-level exports based on the ports of exit rather than state of origin.

As part of its commitment to help mitigate the effects of these challenges faced by producers in North Dakota on the international markets, the CAPTS frequently performs research. This report is the output of a collaboration between the CAPTS and NDSC with the aim of overcoming challenges of soybean trade in North Dakota.

To evaluate the possible effects of these challenges and propose plausible solutions, the need exists for accurate and up-to-date data at different levels of aggregation. The objective of this study is to develop a statistical-based method to estimate the soybean exports by the individual states within the U.S.

Obtaining this estimate will be useful to examine the actual determinants of the soybean exports at the state level. Knowing this can help Congress formulate policies with emphasis on states that are major producers of soybeans.

This report, as part of a series of research in line with the collaborative objective, presents data on soybean trade

indicators. This trade indicator report presents data on the following variables through time (temporal) and across geographical space (spatial):

- Export value
- Import value
- Price

## Why is This Report Important?

This report presents systematically aggregated trade information for soybean producers. First, it is important because it contains details of exports and imports based on soybean byproducts through time. This information reveals the shifting demand for these byproducts through time.

For U.S. soybean producers, this information is relevant for them to identify major competitors and potential new markets. Identifying the competitors will aid in policy formulation to increase market dominance, while identifying new markets will help increase total market share (and subsequently revenue) through exploring these new destinations.

Secondly, the report presents information on soybean prices during the period in addition to statistical risk. The financial markets (prices) form the bedrock of profit maximization and income sustainability. These trends and statistical risks are important because they reveal the volatilities and possible losses or gains. For North Dakota soybean producers, this report presents a set of accurate state-level exports that eliminates the port bias problem.

Typically, the demand for state production incentives can be boosted with higher historic exports. However, under situations where the exports for certain states are underestimated due to the port bias problem, the representatives have difficulty in obtaining the necessary incentives for their producers. These accurate state-level exports can be used for negotiations by state representatives or commodity groups for incentives for soybean producers in North Dakota.

## Data and Methods

The U.S. national and state-level exports and imports from the world and individual countries are available from Global Agricultural Trade System (GATS), U.S. Department of Agriculture, Foreign Agricultural Service (USDA-FAS). These trade data are presented at bulk and byproduct levels identified by their harmonized system (HS) codes. The soybean trade data were obtained from this website at the byproduct level. The groups (with their HS codes) obtained are:

- Whole soybeans (120100 and 120190)
- Soybean seeds (120110)
- Soybean flour (120810)
- Soybean residue (230400)
- Soybean crude oil (150710)
- Soybean refined oil (150790)

To compute the production-adjusted state-level exports, production data were obtained from the USDA National Agricultural Statistical Services (NASS). The Statistical Analysis System (SAS) software is used in the generation of tables and graphs. These are presented at:

- World (aggregate and countries)
- U.S. (aggregate and states)

The empirical framework for this report includes annual trends, five-year changes and summary statistics (mean, risk/deviations and coefficient of variation) and intensity of trade (market share) among countries and states. The results presented at various levels would help the soybean producers not only evaluate their options for the present but also develop strategies for the future based on the market trends and risks.

- Annual trends: The annual trends of global exports, imports and prices of soybeans are presented in the report. The export and import values also are presented by trends for the top 15 countries. At the U.S. level, the trends of these indicators are presented for the whole country and top 15 states. At the North Dakota level, the trends are presented and compared for our computed production-adjusted exports, USDA FAS exports and ERS exports. Presenting these trends in the report will provide a framework to gauge the changes through time across countries and states. Furthermore, it will help reveal the extent of bias accumulation attributed to the current USDA FAS method of computing state exports. Knowing these trends can serve as a basis for estimating the volatilities and their sources. This can help forecast future possibilities for desired horizons for advance decision-making.
- Five-year changes: This report further presents histograms of the five-year sums of the trade indicators at the various levels of aggregation and product group level. Having the indicators for five-year periods in the report will provide a framework to evaluate the increase/decrease or shifts across periods.
- Summary statistics: The summary statistics are provided for the various levels of aggregation for all the trade indicators enumerated. This will provide a framework to evaluate the magnitude of the variables using totals, averages, risks, coefficient of variation and intensity of the trade variables in the form of market share.

## Key Findings

### Global Trend and Risk

Global soybean export quantity and value increased steadily during the period (Figure 1). Between 2014 and 2018, whole soybeans accounted for 60.2% of the global export share of soybean products. Soybean residue accounted for 28.5% of the share in this period. The third important byproduct in this period was crude soybean oil (8%).

Figure 7 presents the global export share of soybean products from 2014 to 2018. The trends of export value, quantity and price for the six byproducts are presented in Figures 8, 9 and 10.

The top 15 exporters of whole soybeans (export value share) based on the period between 2014 and 2018 are:

1. Brazil (45.1%)
2. U.S. (38.3%)
3. Argentina (5.63%)
4. Paraguay (2.89%)
5. Canada (2%)
6. Uruguay (1.95%)
7. Ukraine (1.61%)
8. Netherlands (0.75%)
9. India (0.25%)
10. Russia (0.21%)
11. China (0.19%)
12. Belgium (0.16%)
13. Croatia (0.12%)
14. Romania (0.11%)
15. France (0.08%)

The trends of the export values for the top 15 countries are presented from Figure 11 to Figure 13. Figures 14 to 28 present trends for the top 15 exporters for the other byproducts. The details for the descriptive statistics can be found in the **appendix**.

The top 15 importers of whole soybeans (import value share) based on the period between 2014 and 2018 are;

1. China (60.7%)
2. Japan (3.33%)
3. Netherlands (2.99%)
4. Spain (2.97%)
5. Germany (2.50%)
6. Indonesia (2.22%)
7. Turkey (2.06%)
8. Mexico (2.86%)
9. Taiwan (1.88%)
10. Thailand (1.86%)
11. Russia (1.66%)
12. Argentina (1.44%)
13. South Korea (1.31%)
14. Italy (1.24%)
15. Vietnam (1.23%)

The trends of the import values for the top 15 countries are presented from Figure 29 to Figure 31. Figures 32 to 46 present trends for the top 15 importers for the other byproducts. The details for the descriptive statistics can be found in the **appendix**.

## U.S. States Trend and Risk

The trends of the share of U.S. soybean exports relative to the world is presented in Figure 47. This figure shows that the U.S. global share of whole soybean exports has declined through time. The implication of this phenomenon suggests that U.S. soybean exports are shifting to processed soybean products in recent times.

The top 15 U.S. export destinations are:

1. China (25.4%)
2. Mexico (3.97%)
3. Japan (2.41%)
4. Indonesia (2.29%)
5. Netherlands (1.84%)
6. Taiwan (1.64%)
7. Germany (1.38%)
8. Egypt (1.12%)
9. Spain (1.03%)
10. Thailand (0.95%)
11. Vietnam (0.84%)
12. Bangladesh (0.76%)
13. South Korea (0.70%)
14. Pakistan (0.69%)
15. Colombia (0.50%)

The trends of the import values for the top 15 U.S. export destination countries are presented from Figure 48 to 50. Figures 51 to 65 present trends for the top 15 U.S. exporting destinations for the other byproducts. The details for the descriptive statistics can be found in the **appendix**.

The production-adjusted export trends of the top 15 states are:

1. Illinois (14.5%)
2. Iowa (13.%)
3. Minnesota (8.56%)
4. Nebraska (7.66%)
5. Indiana (6.89%)
6. Ohio (6.27%)
7. Missouri (6.14%)
8. South Dakota (5.51%)
9. North Dakota (5.07%)
10. Arkansas (4.01%)
11. Kansas (3.98%)
12. Mississippi (2.80%)
13. Michigan (2.36%)
14. Wisconsin (2.29%)
15. Kentucky (2.29%)

The trends of the indicators for the top 15 exporting states are presented from Figure 66 to Figure 71. The details for other indicators at the global level can be found in the **appendix**.

## North Dakota Whole Soybean Exports

The USDA FAS reports state export values are based on reported port values. Hence, the data obtained from the USDA FAS website do not reflect the actual performance of the individual states in terms of their export and production. To that effect, state representatives have difficulty negotiating for incentives and farm programs for domestic farmers. To solve this problem, this report employs a production accounts method to estimate North Dakota soybean exports.

For consistency, the cash-receipts based method that is employed by the USDA ERS to estimate state level exports also is obtained. The export value for these three methods is presented in Tables 1, 2 and 3. A comparison of the three data types is shown in Table 4 for the total export value during the period.

You can see that the production accounts method and cash-receipts method yield similar results. The data from USDA FAS underestimates North Dakota soybean exports by about 10 times relative to the production accounts method. For instance, the production adjusted export value predicts a value of \$885,365,842 in 2018 while the ERS method predicted \$887,896,380 for North Dakota. On the other hand, the FAS presents a value of \$62,543,314.

## Future Research Proposal

Exports are particularly important for every economy. Furthermore, in the case of North Dakota, where production mostly exceeds domestic consumption, the need to explore foreign market potentials is essential. From this report, we can observe that the current trends of soybean trade for North Dakota have been increasing. Evaluating the determinants of North Dakota soybean exports is essential.

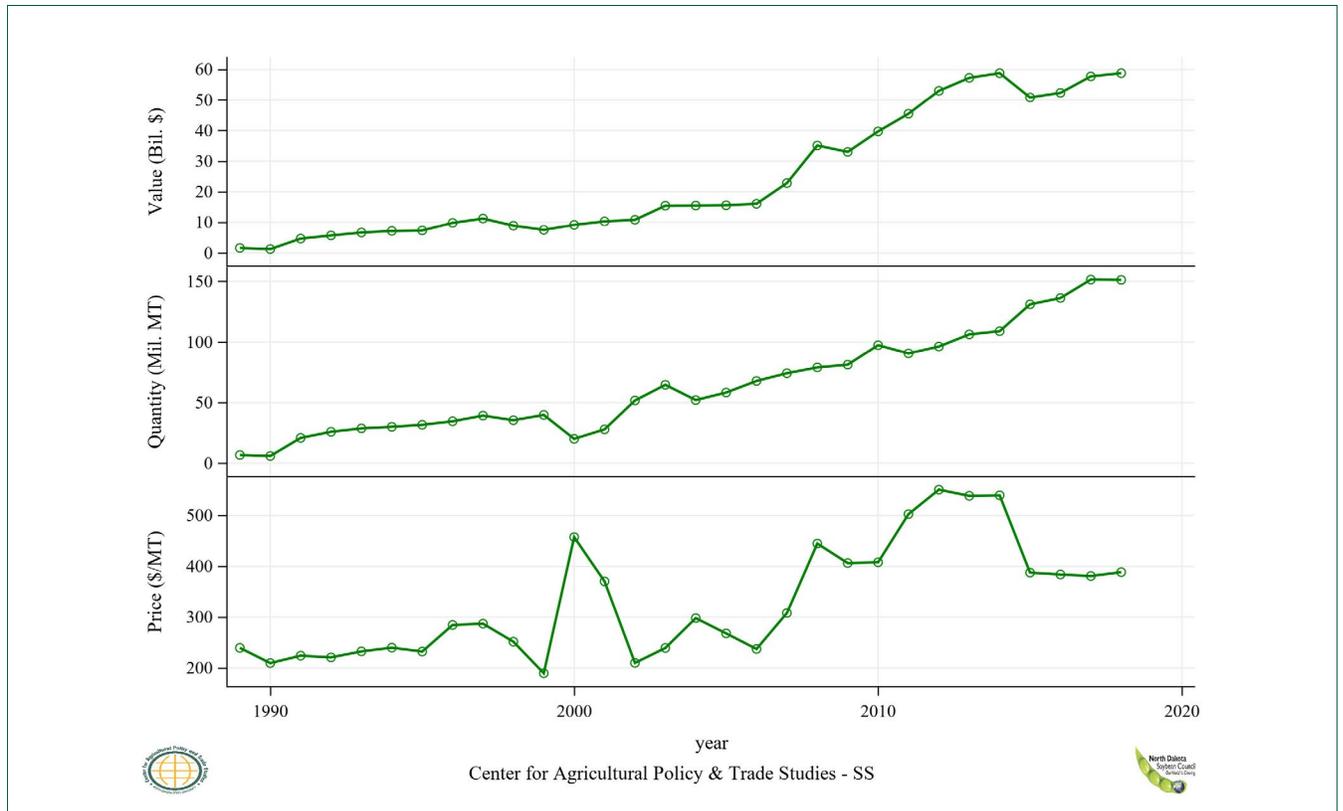
- The next stage of this research seeks to evaluate the efficiency of U.S. state agricultural exports and its determinants. Of particular interest are the impact of genetically modified restrictive index, tariffs and other transportation costs. The expected outcome of the estimation is to provide the requisite knowledge that will give North Dakota soybean farmers a comparative advantage on the international markets, given that these variables have become very instrumental drivers of international trade in recent years characterized by geopolitical disputes.
- The second objective will be to examine the determinants of commodity price volatilities and their impact on North Dakota production and exports.

■ Section I

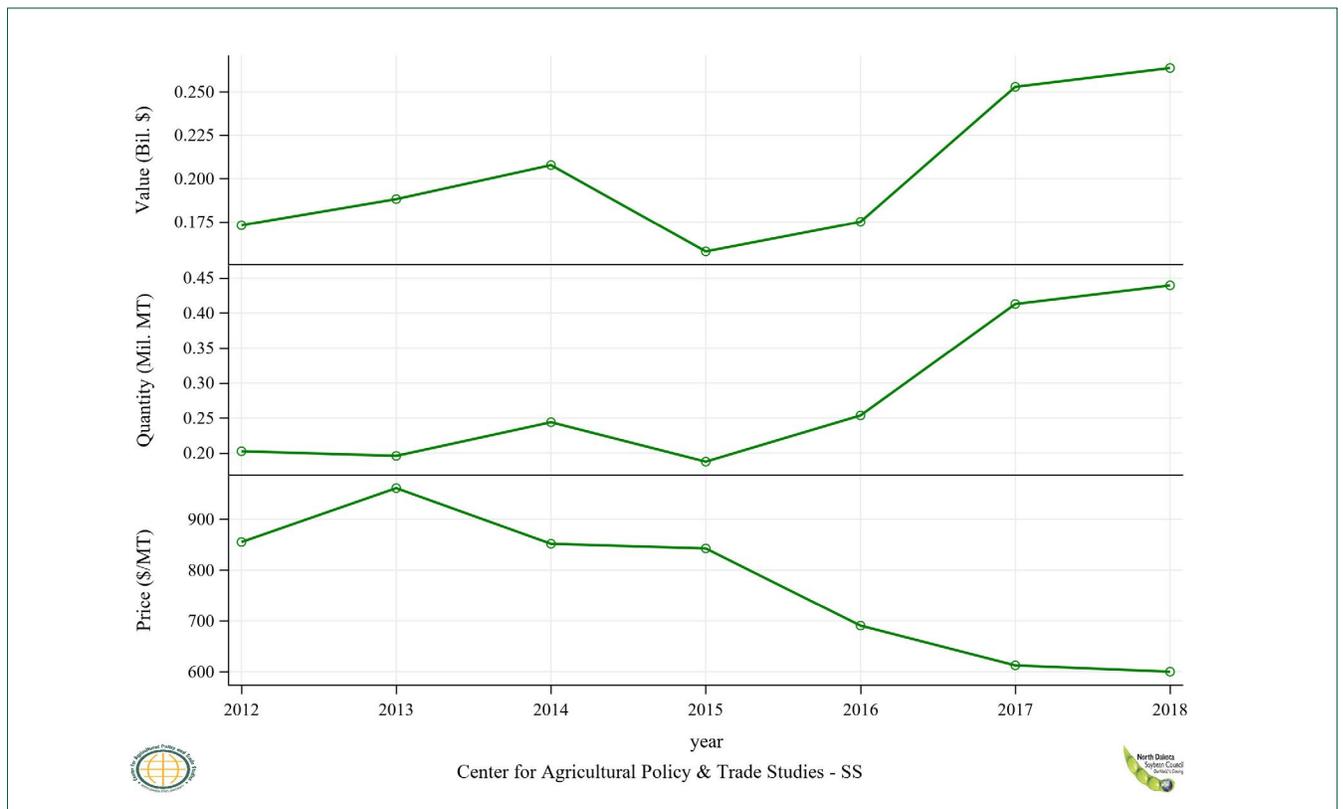
# Global Temporal Soybean Trade

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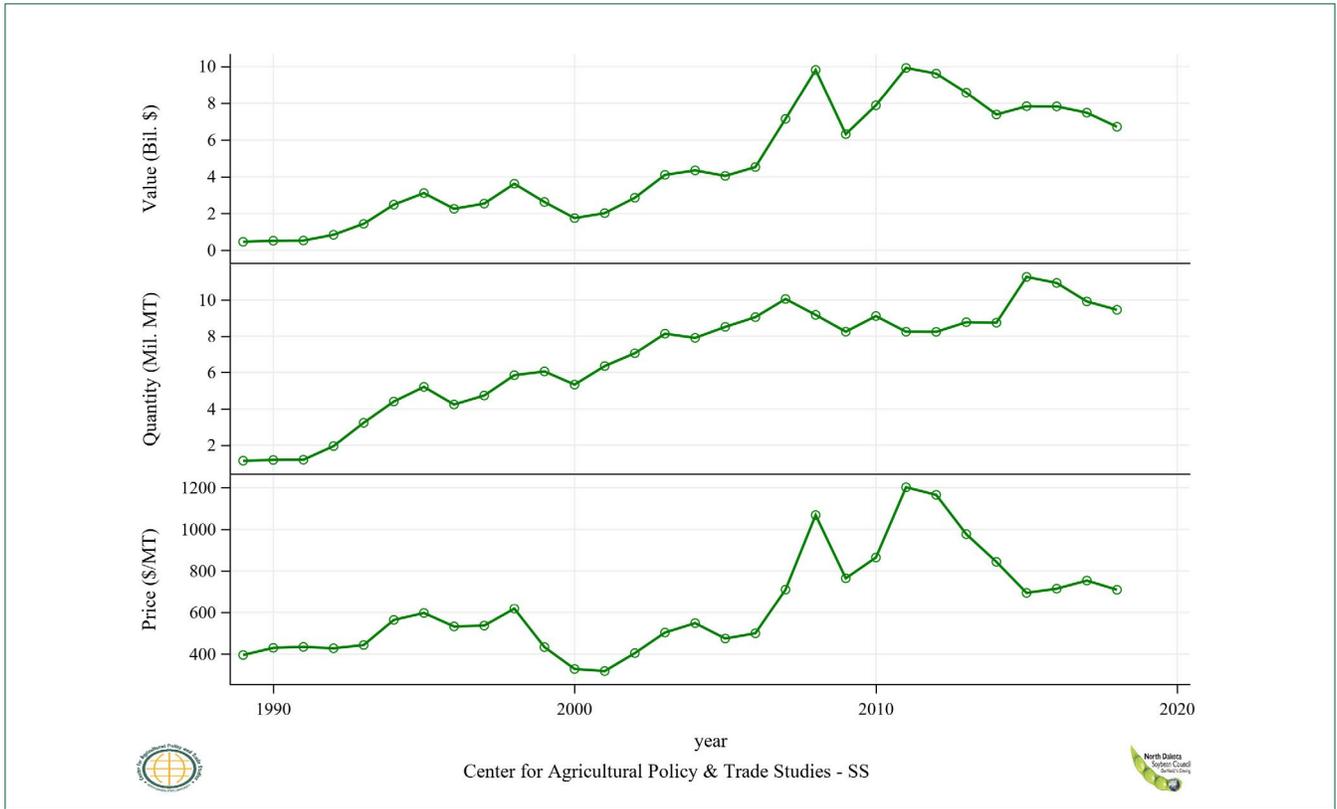
**Figure 1: Global Soybean Exports, Annual Trends**



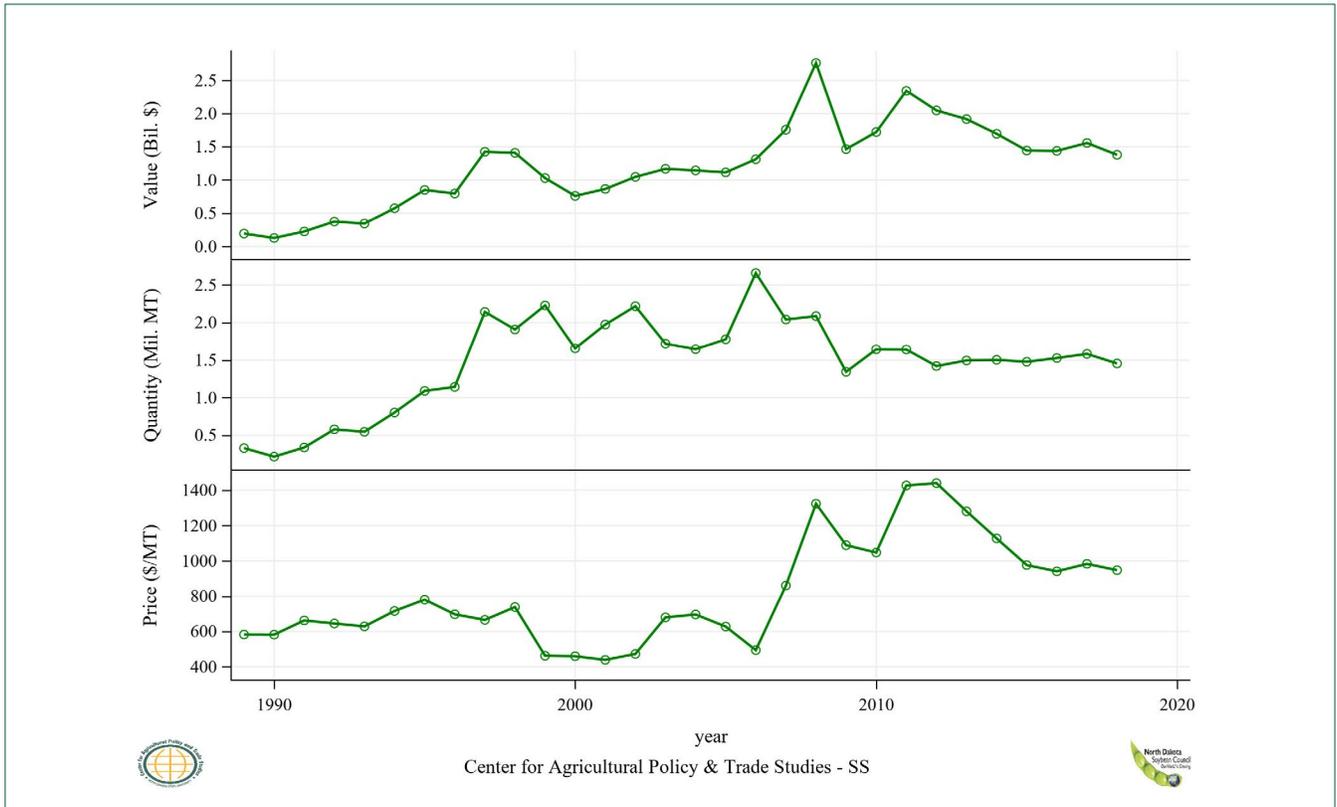
**Figure 2: Global Soybean, Seed Exports, Annual Trends**



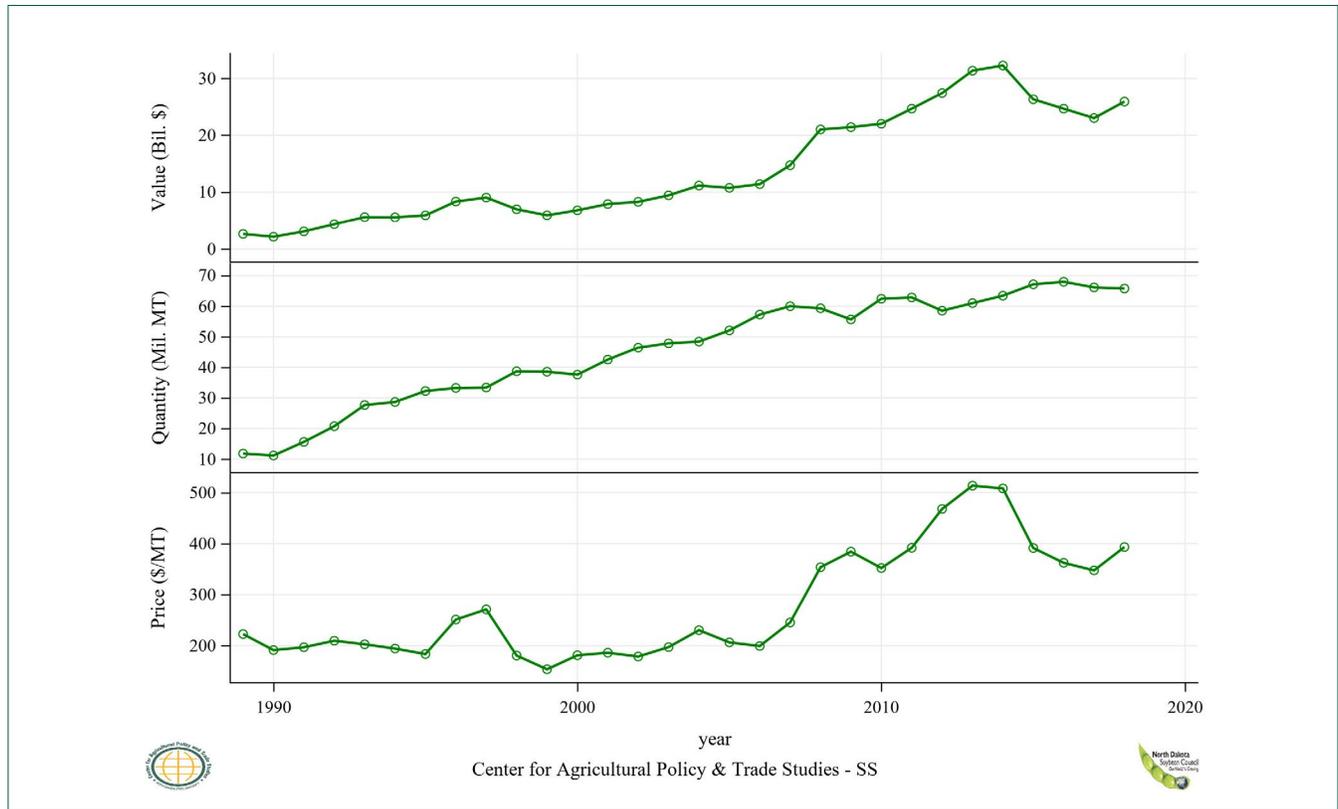
**Figure 3: Global Soybean Oil Crude Exports, Annual Trends**



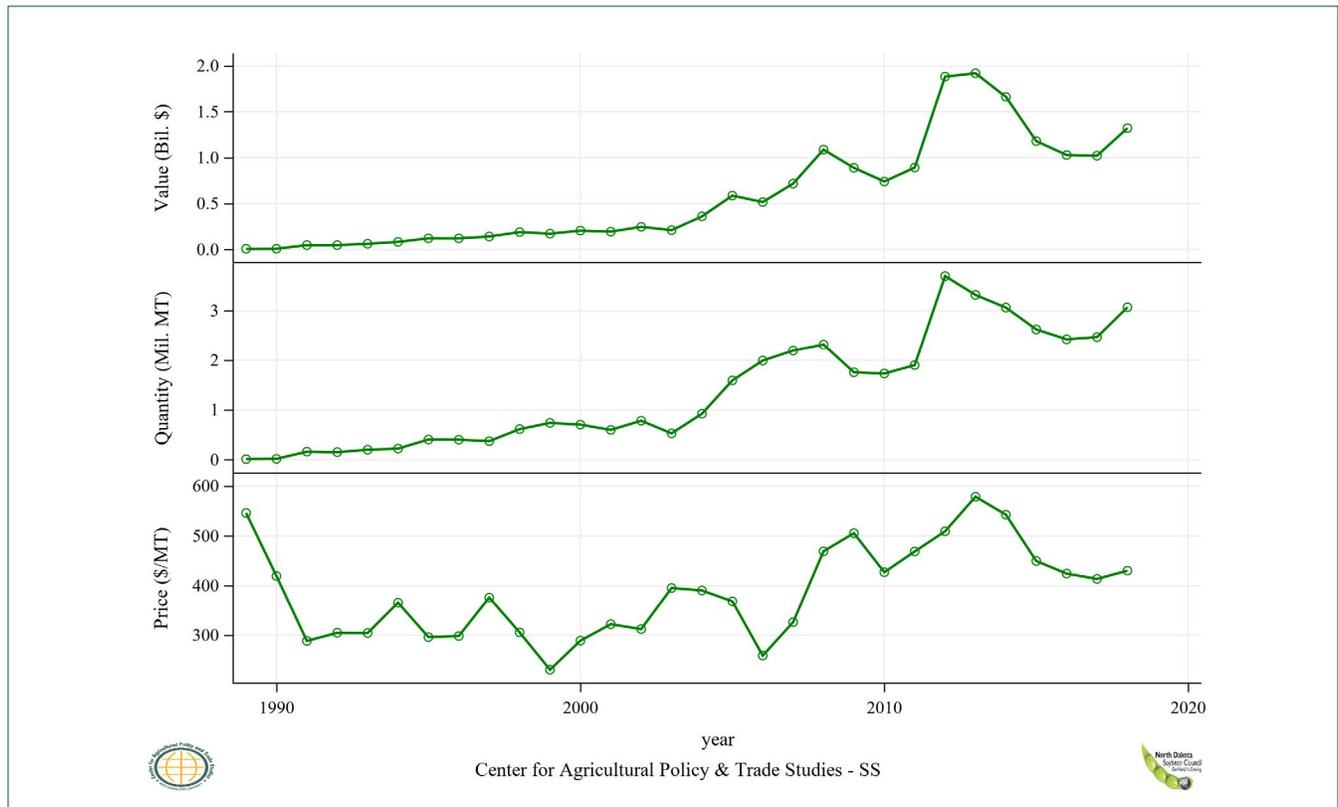
**Figure 4: Global Soybean Oil Refined Exports, Annual Trends**



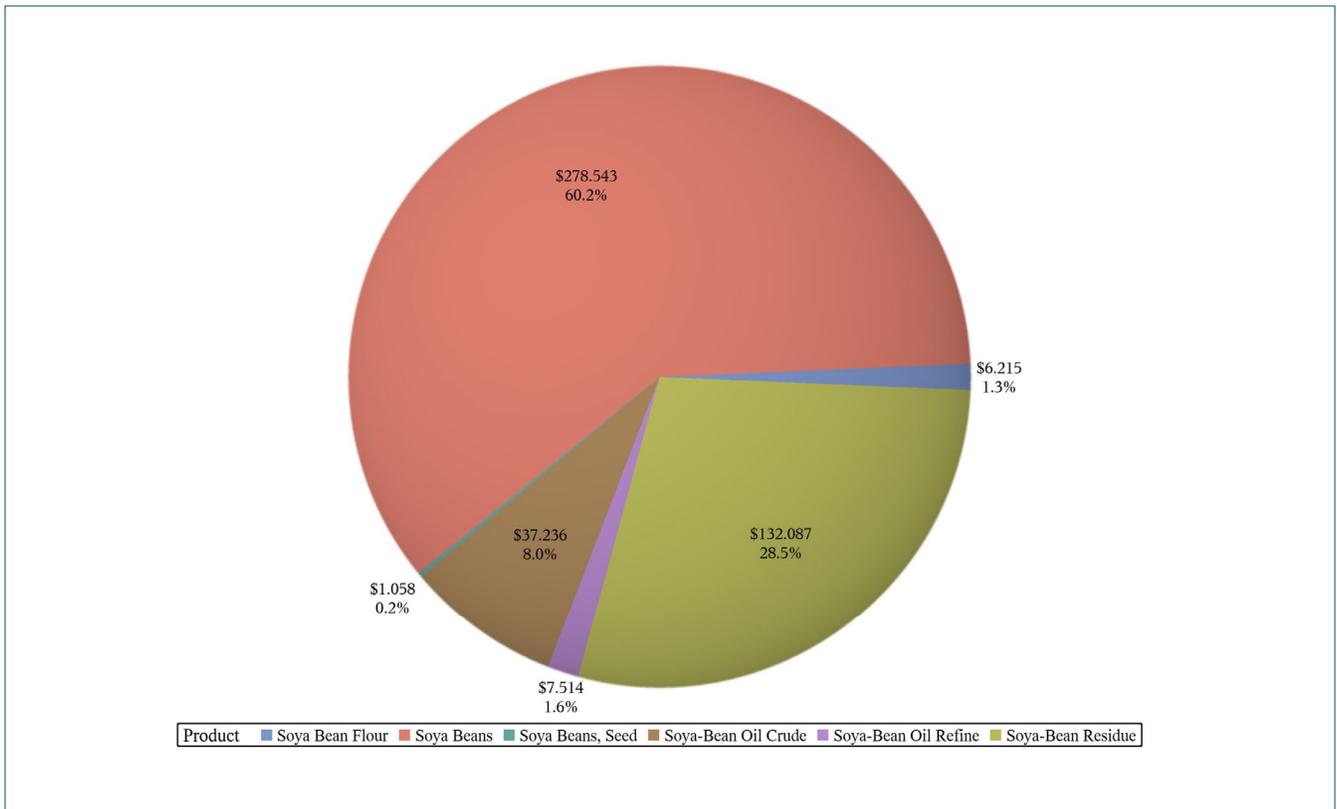
**Figure 5: Global Soybean Residue Exports, Annual Trends**



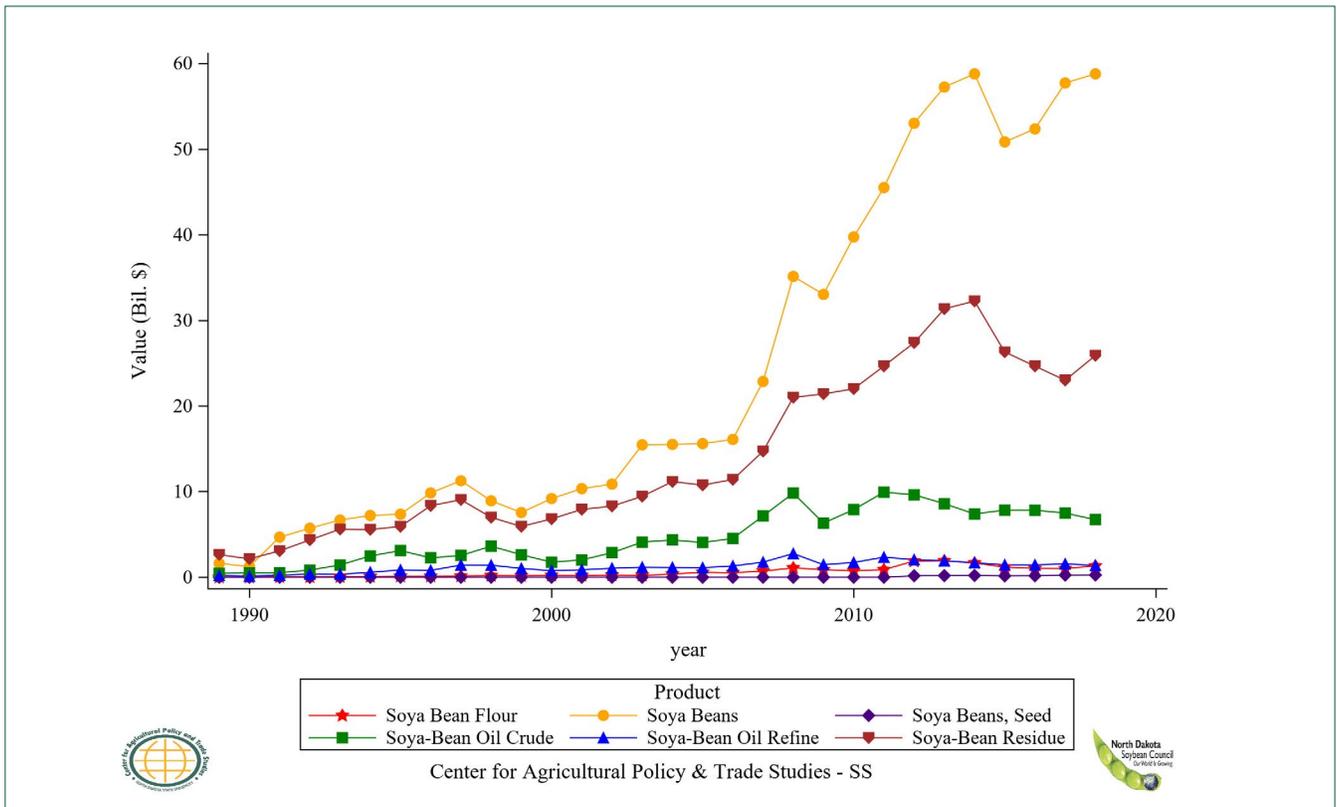
**Figure 6: Global Soybean Flour Exports, Annual Trends**



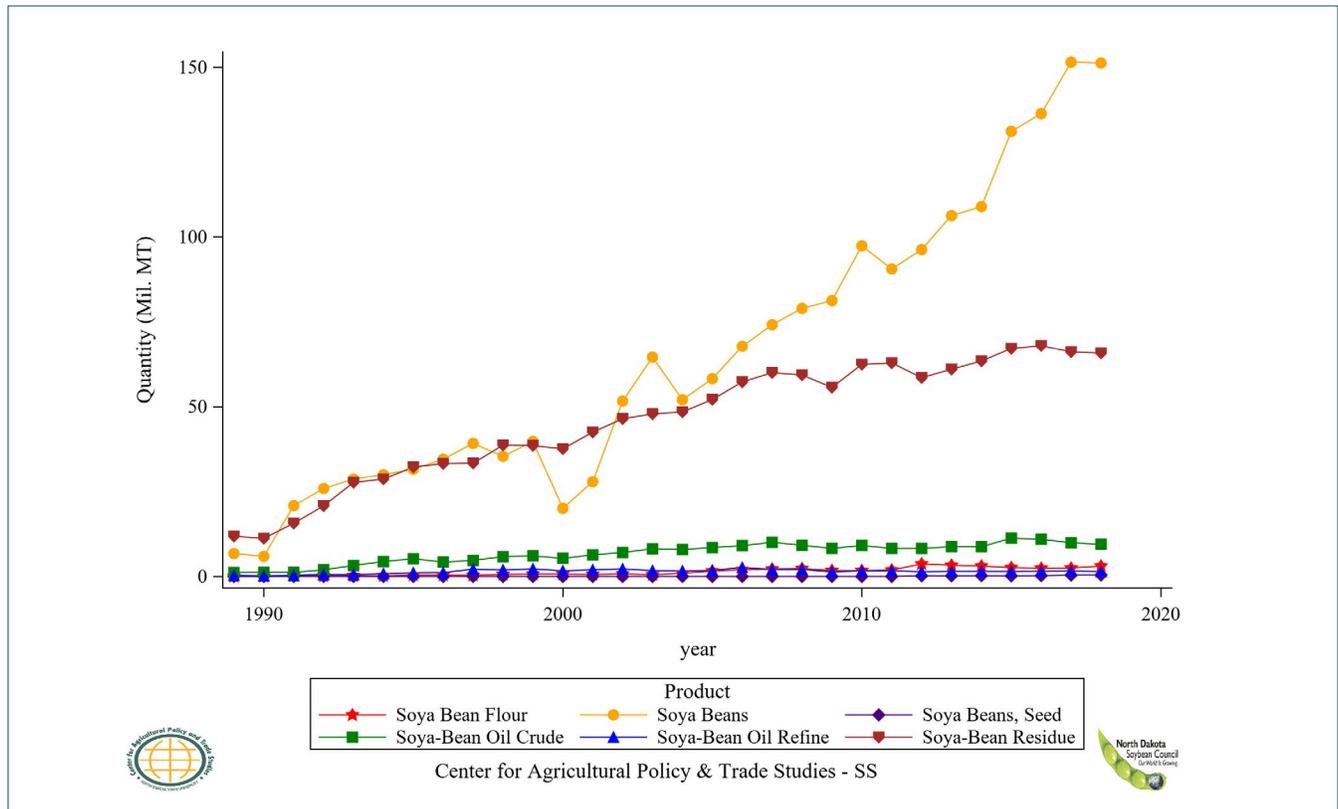
**Figure 7: Global Export Share of Soybean Products, 2014-2018**



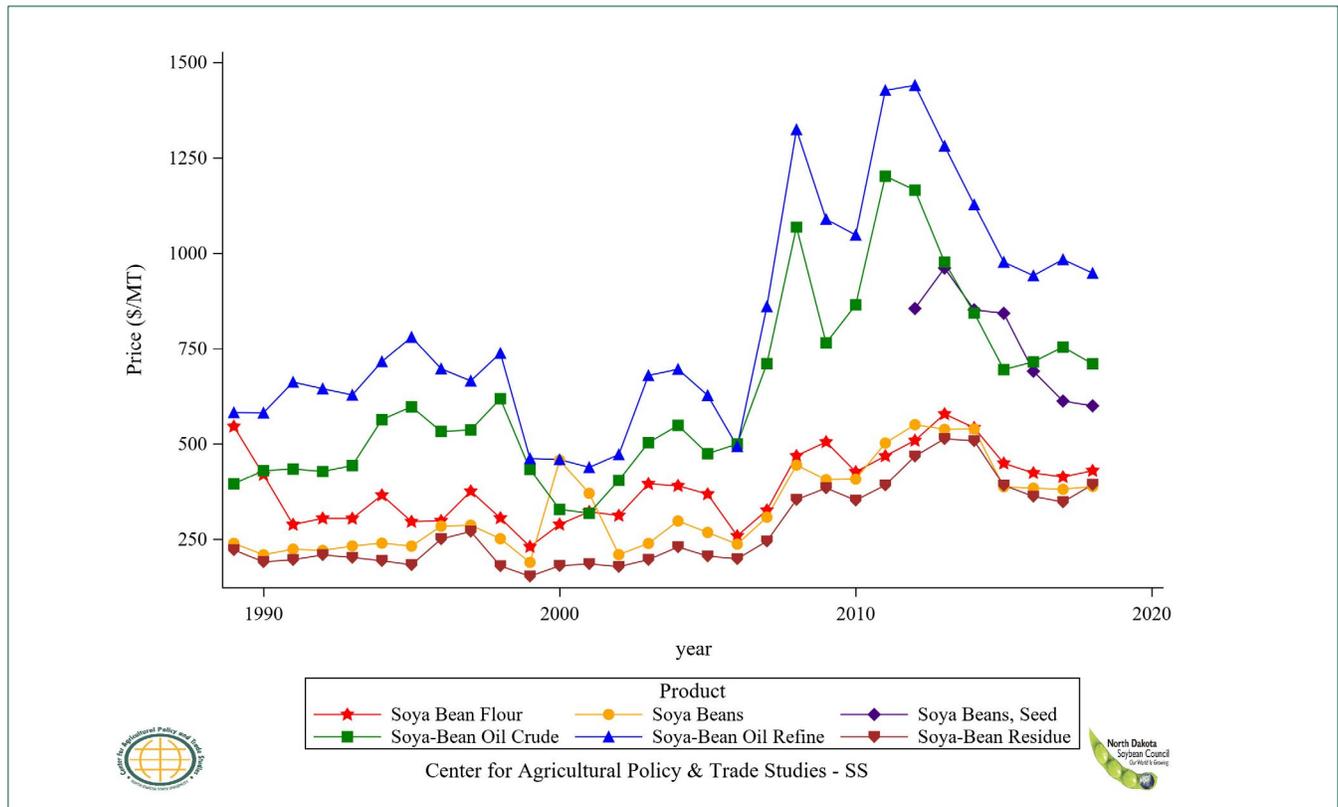
**Figure 8: Global Export Value of Soybean Products, Annual Trends**



**Figure 9: Global Export Quantity of Soybean Products, Annual Trends**



**Figure 10: Global Export Price of Soybean Products, Annual Trends**

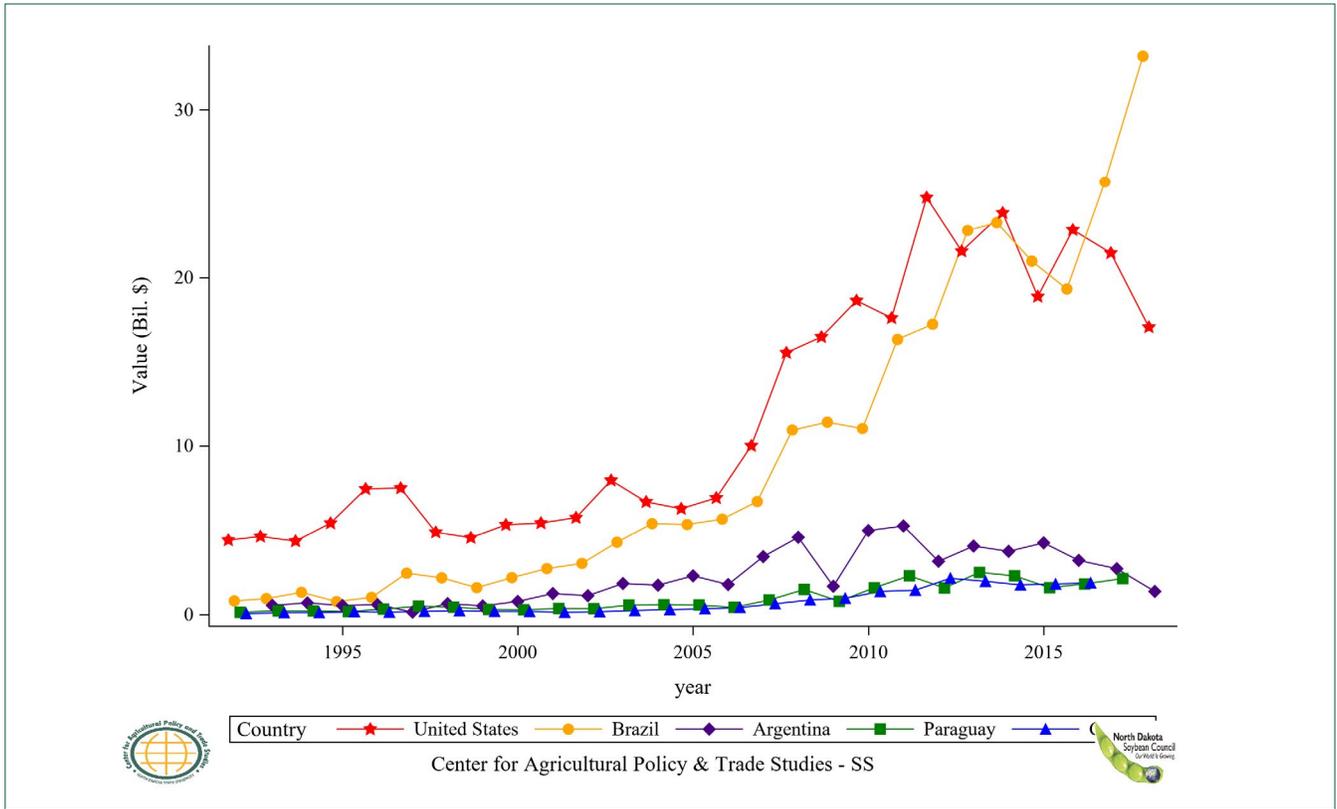


■ Section II

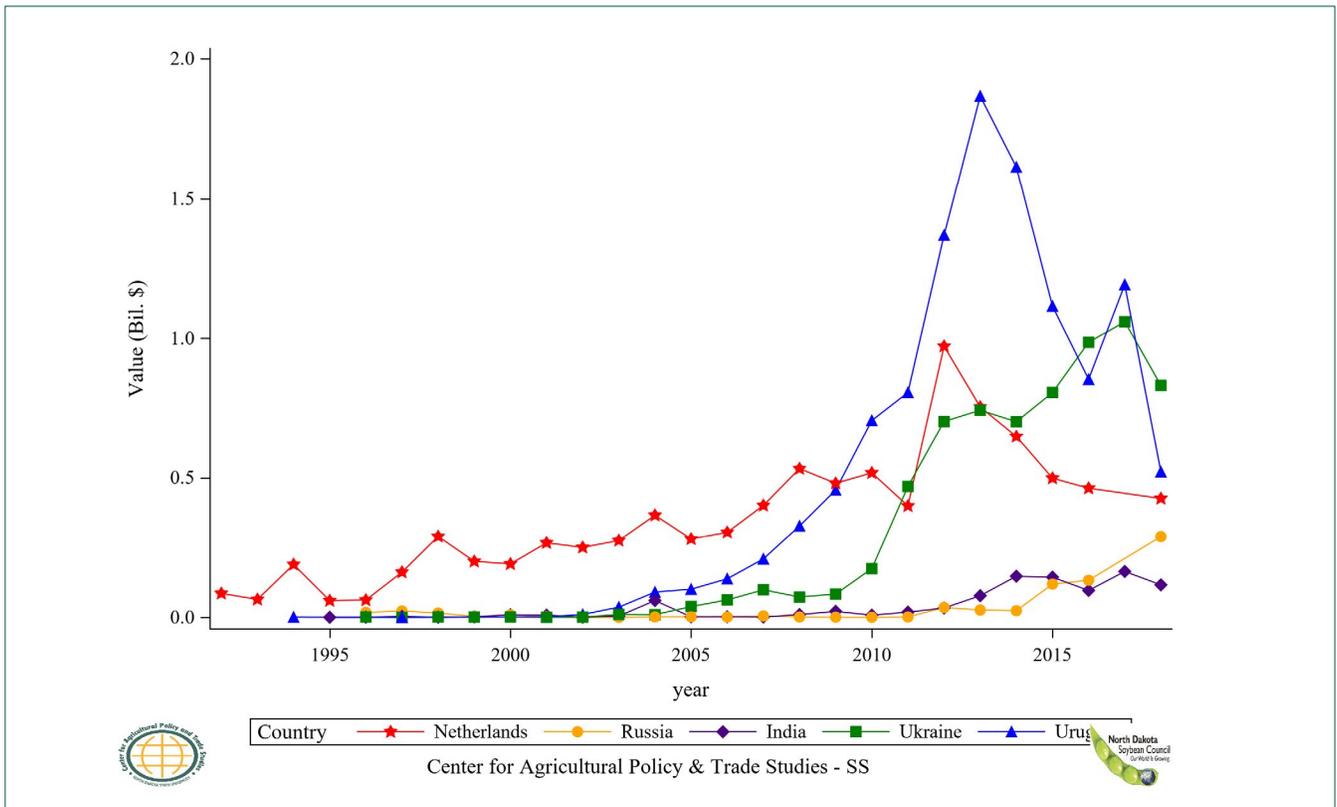
# Global Spatial Soybean Export

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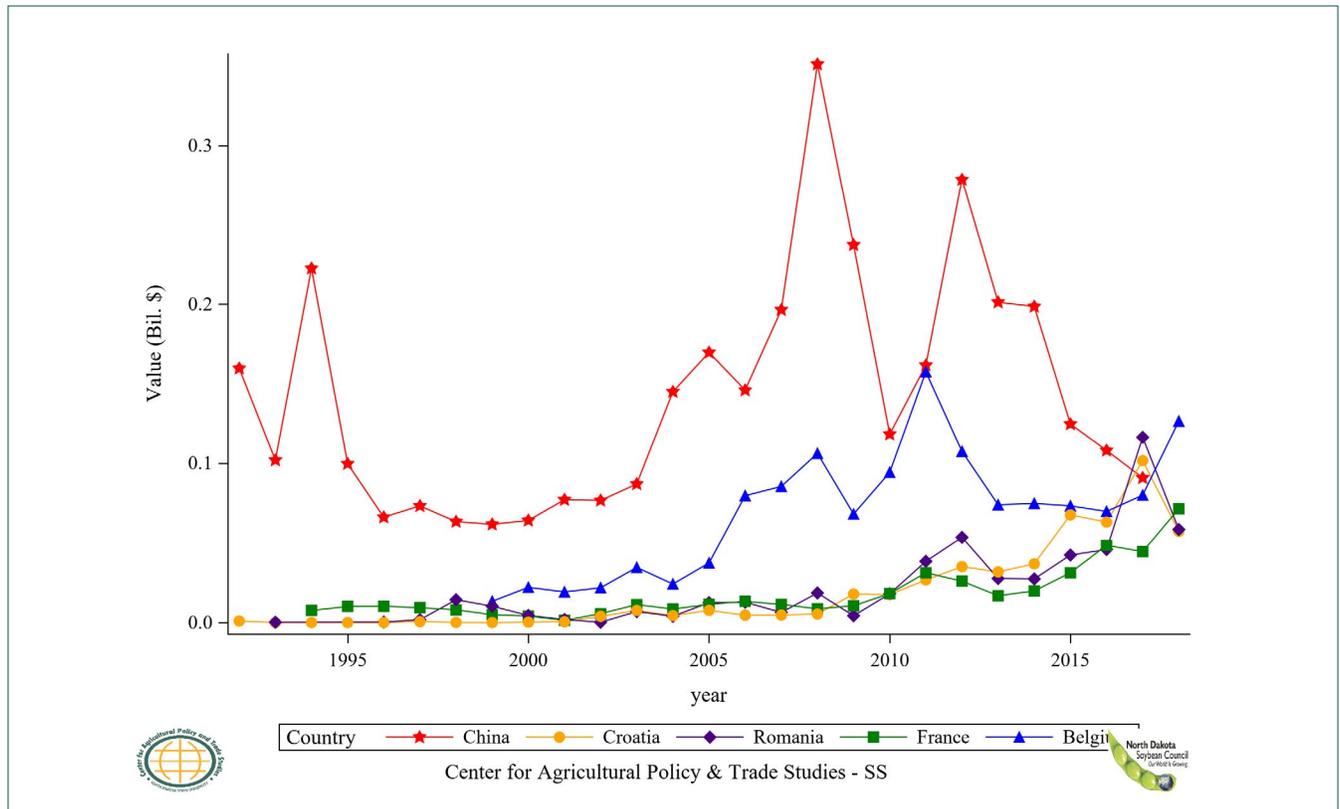
**Figure 11: Top 5 Countries Soybean Export Value, Annual Trends**



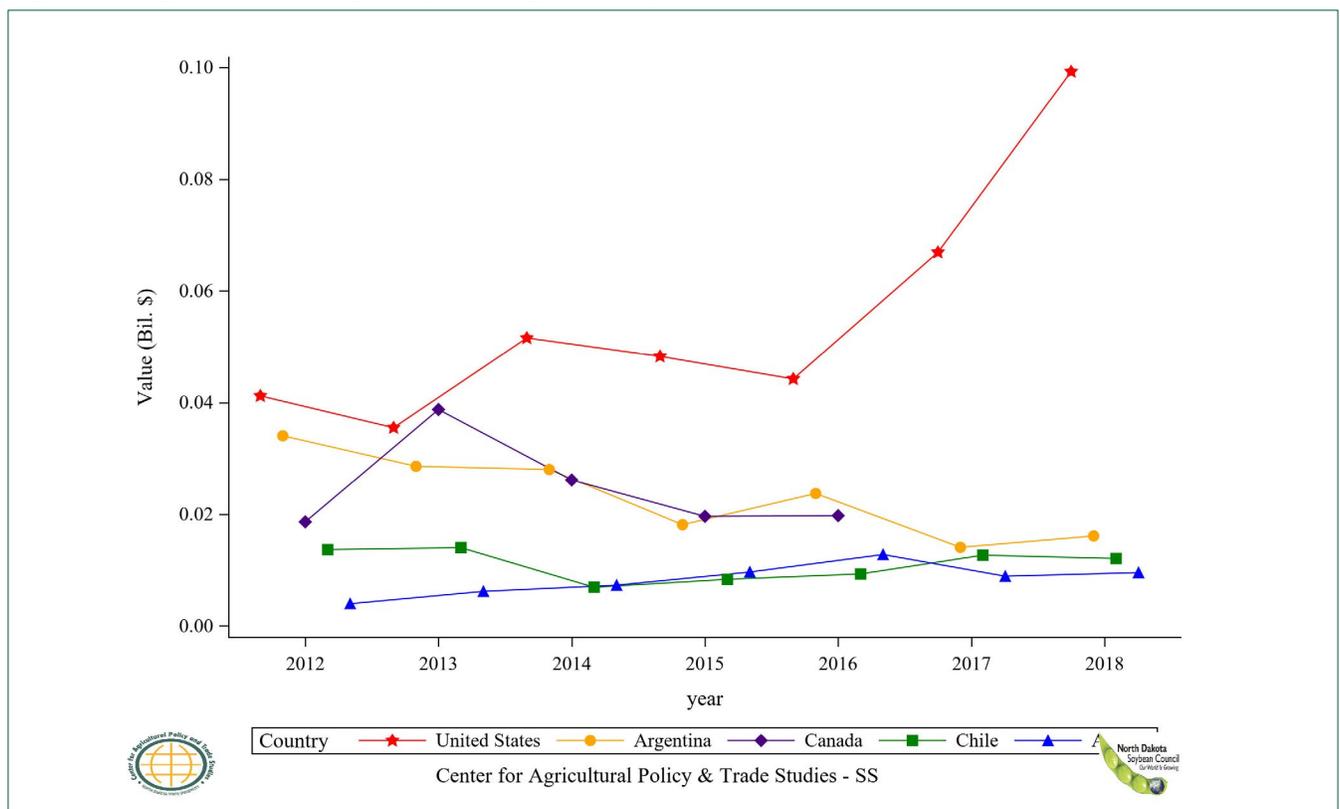
**Figure 12: Top 6 to 10 Countries Soybean Export Value, Annual Trends**



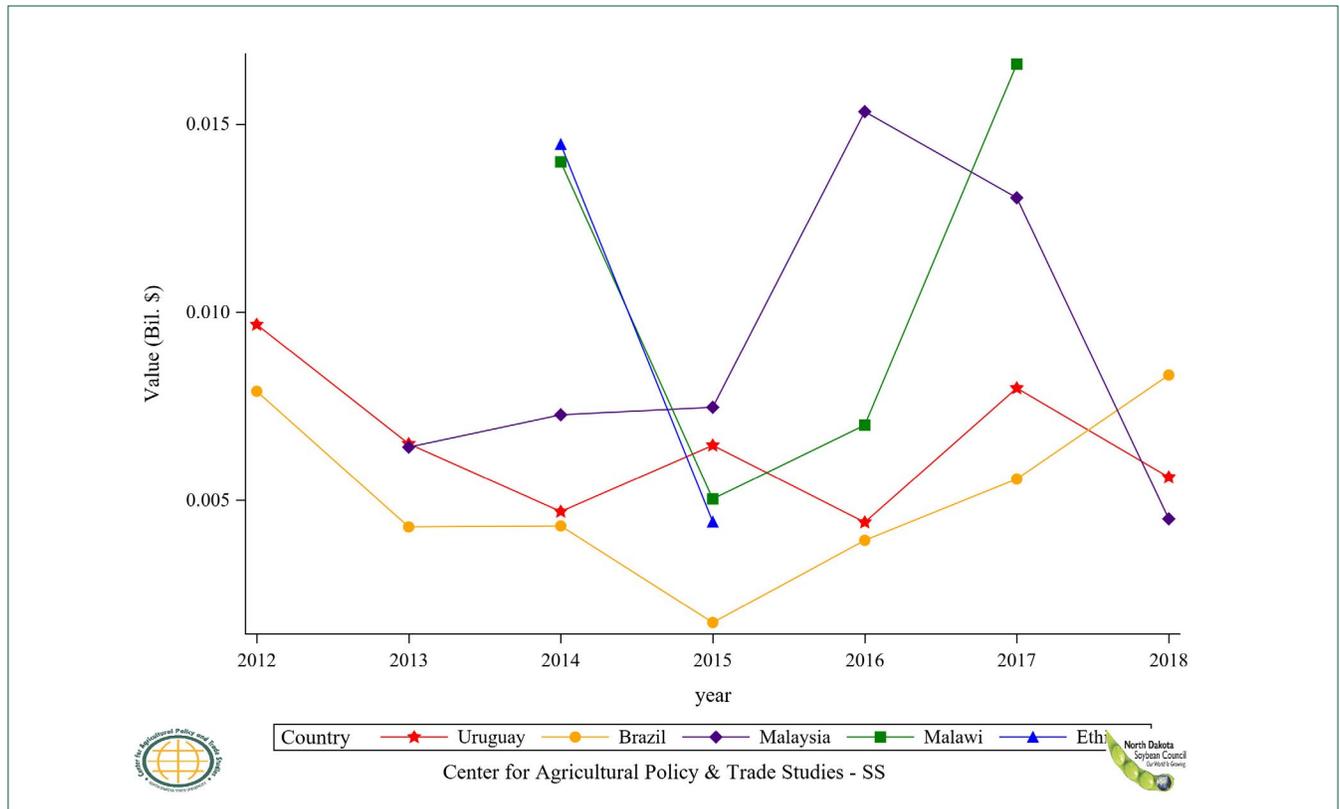
**Figure 13: Top 11 to 15 Countries Soybean Export Value, Annual Trends**



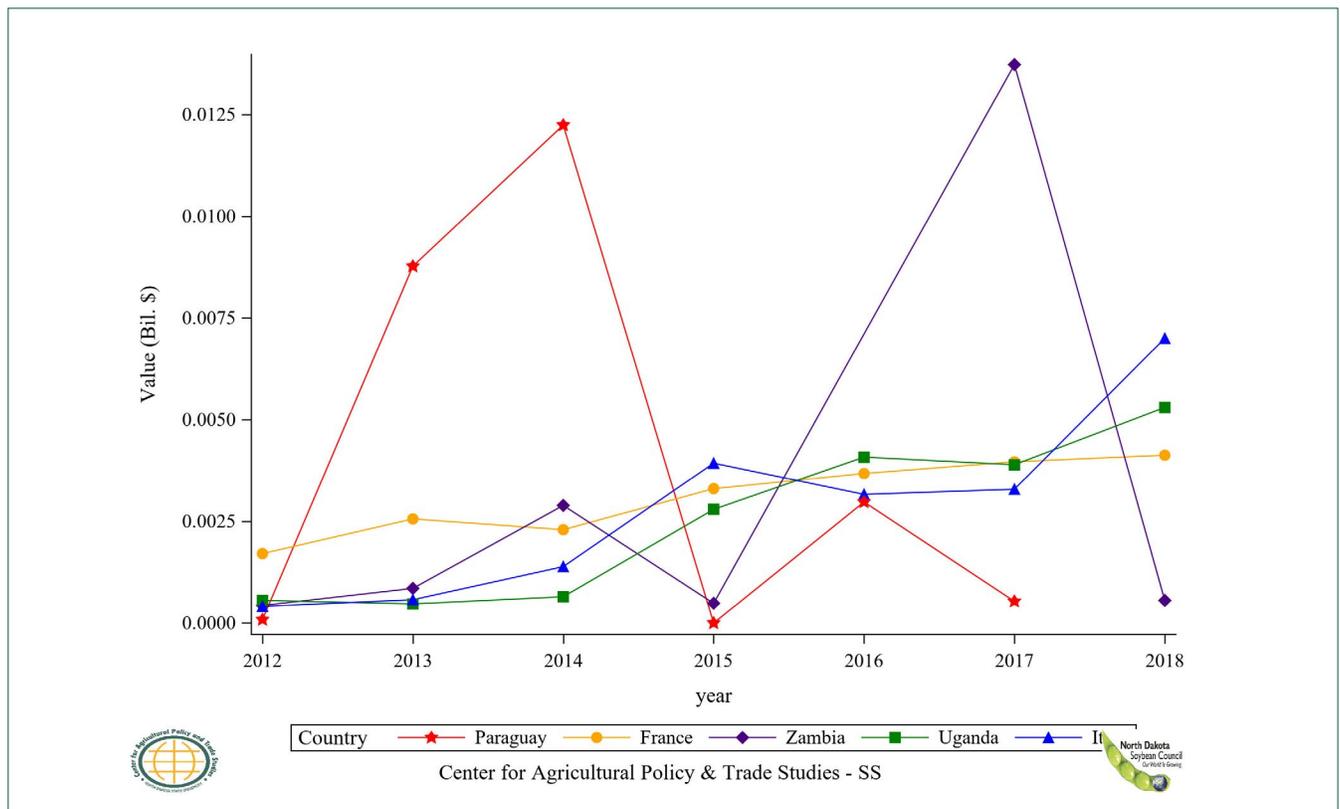
**Figure 14: Top 5 Countries Soybean, Seed Export Value, Annual Trends**



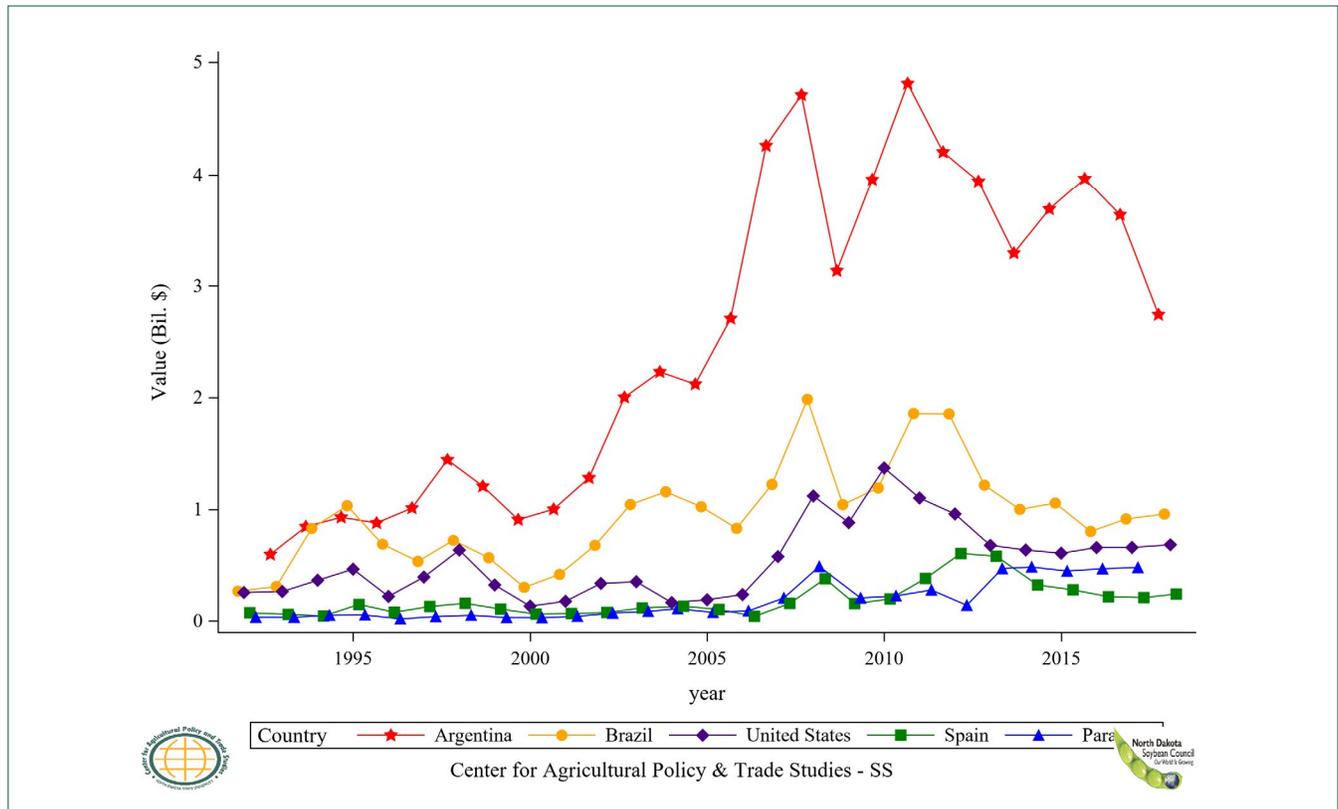
**Figure 15: Top 6 to 10 Countries Soybean, Seed Export Value, Annual Trends**



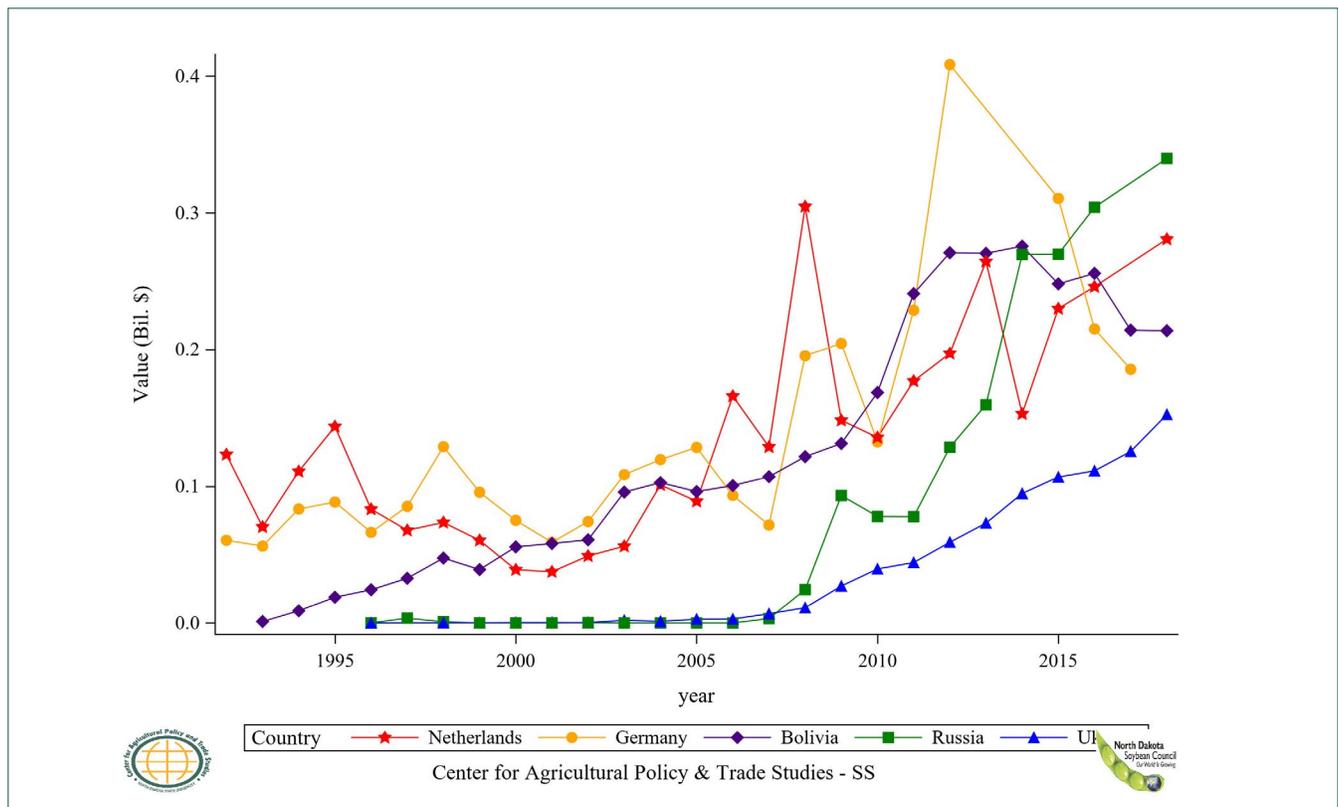
**Figure 16: Top 11 to 15 Countries Soybean, Seed Export Value, Annual Trends**



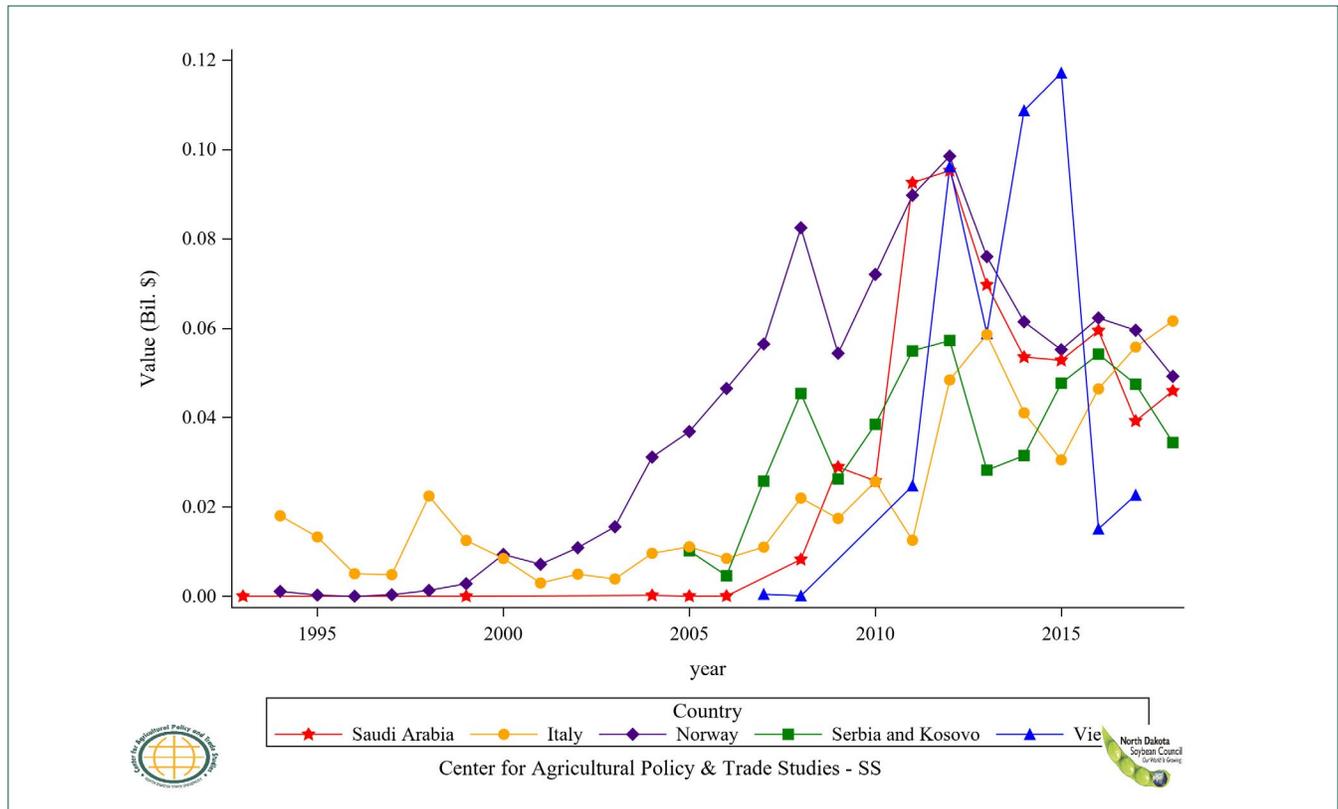
**Figure 17: Top 5 Countries Soybean Oil Crude Export Value, Annual Trends**



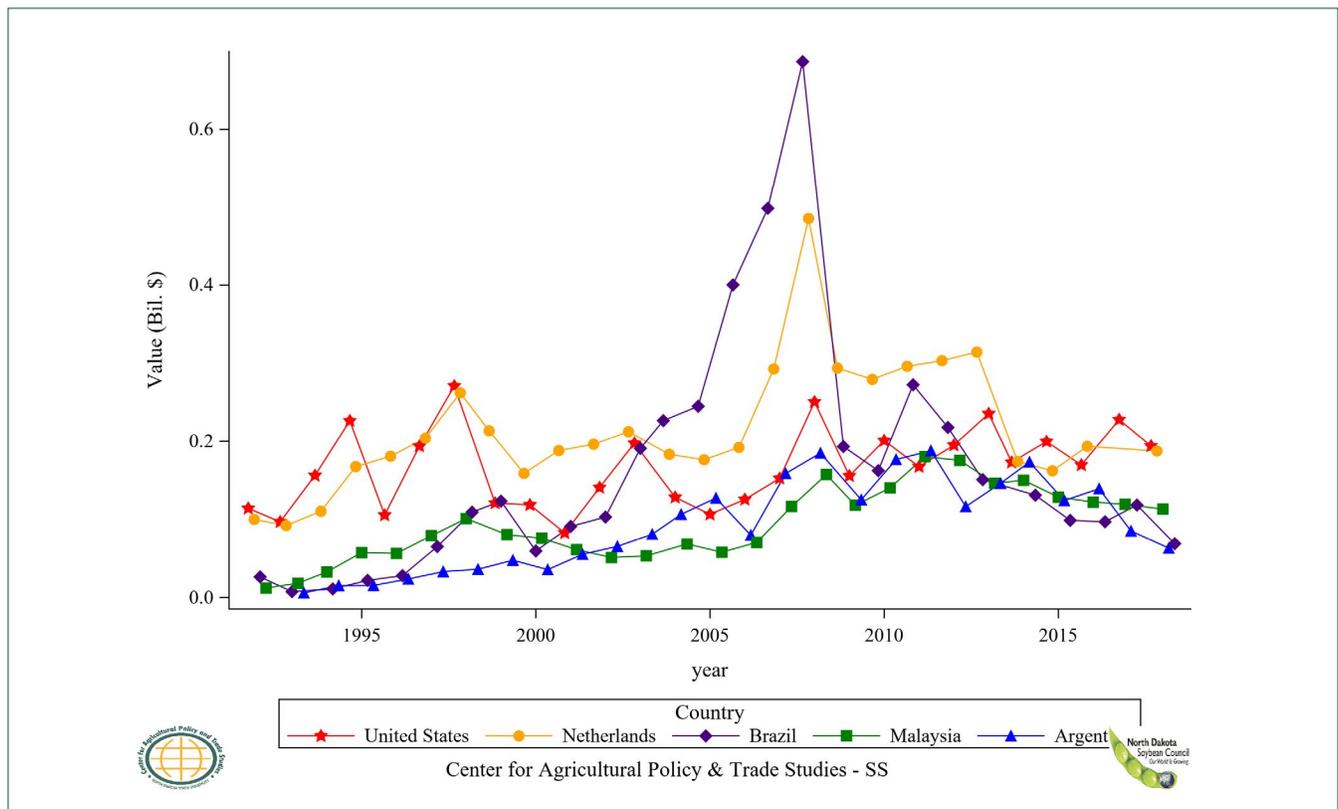
**Figure 18: Top 6 to 10 Countries Soybean Oil Crude Export Value, Annual Trends**



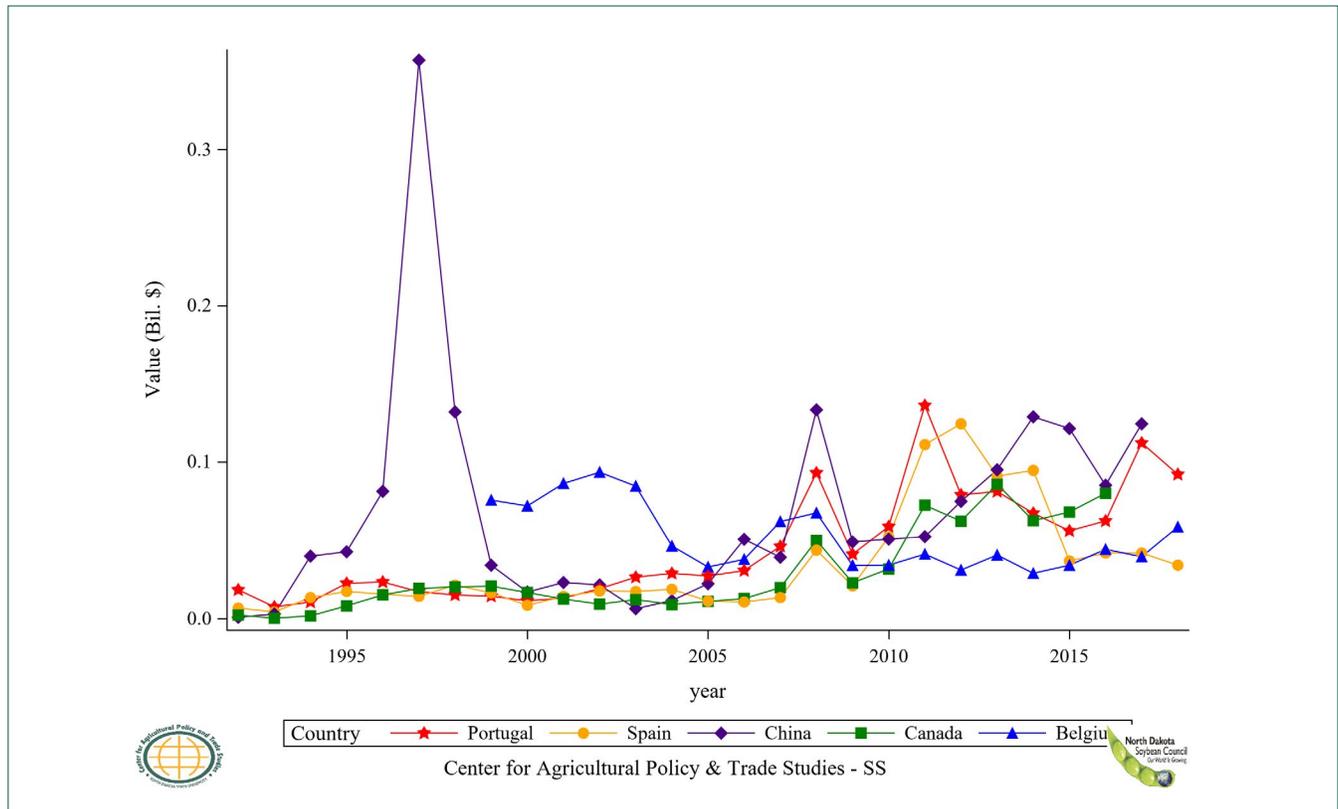
**Figure 19: Top 11 to 15 Countries Soybean Oil Crude Export Value, Annual Trends**



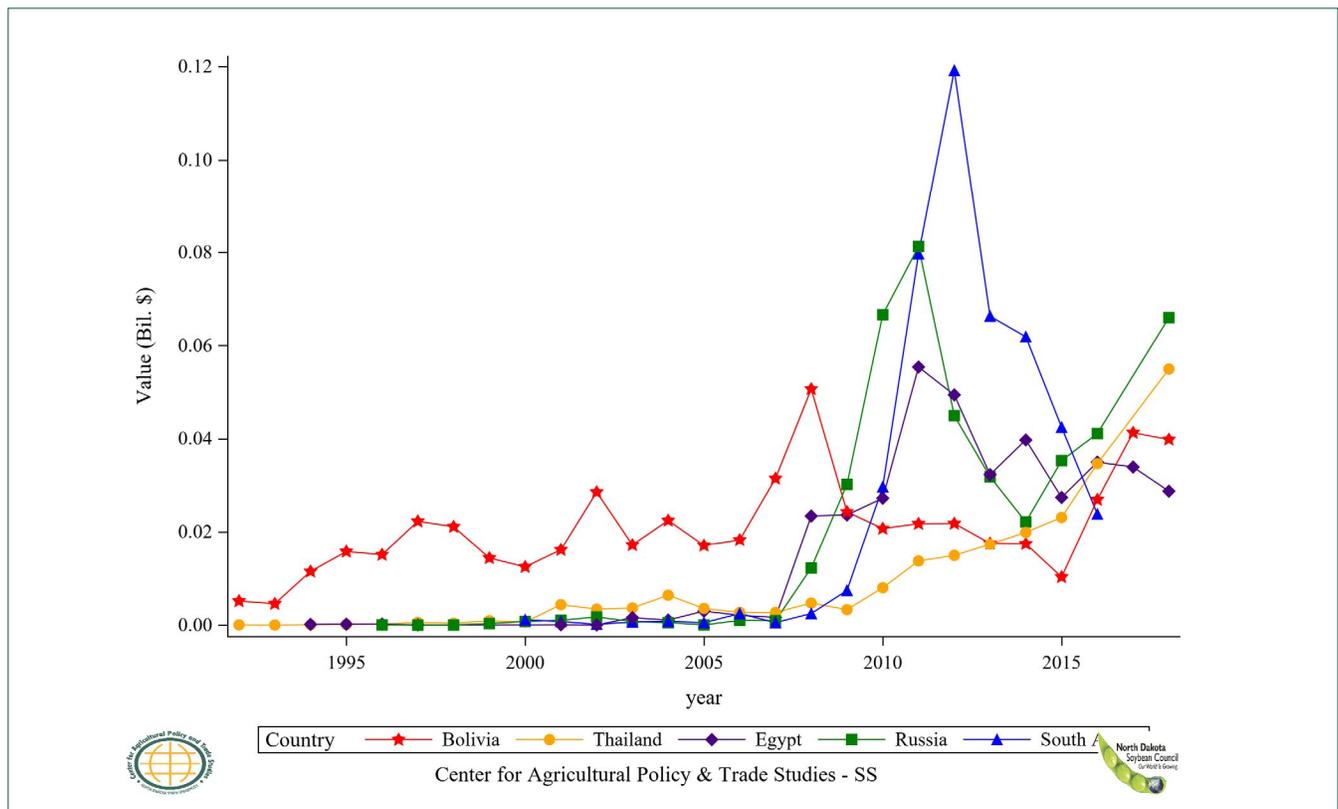
**Figure 20: Top 5 Countries Soybean Oil Refined Export Value, Annual Trends**



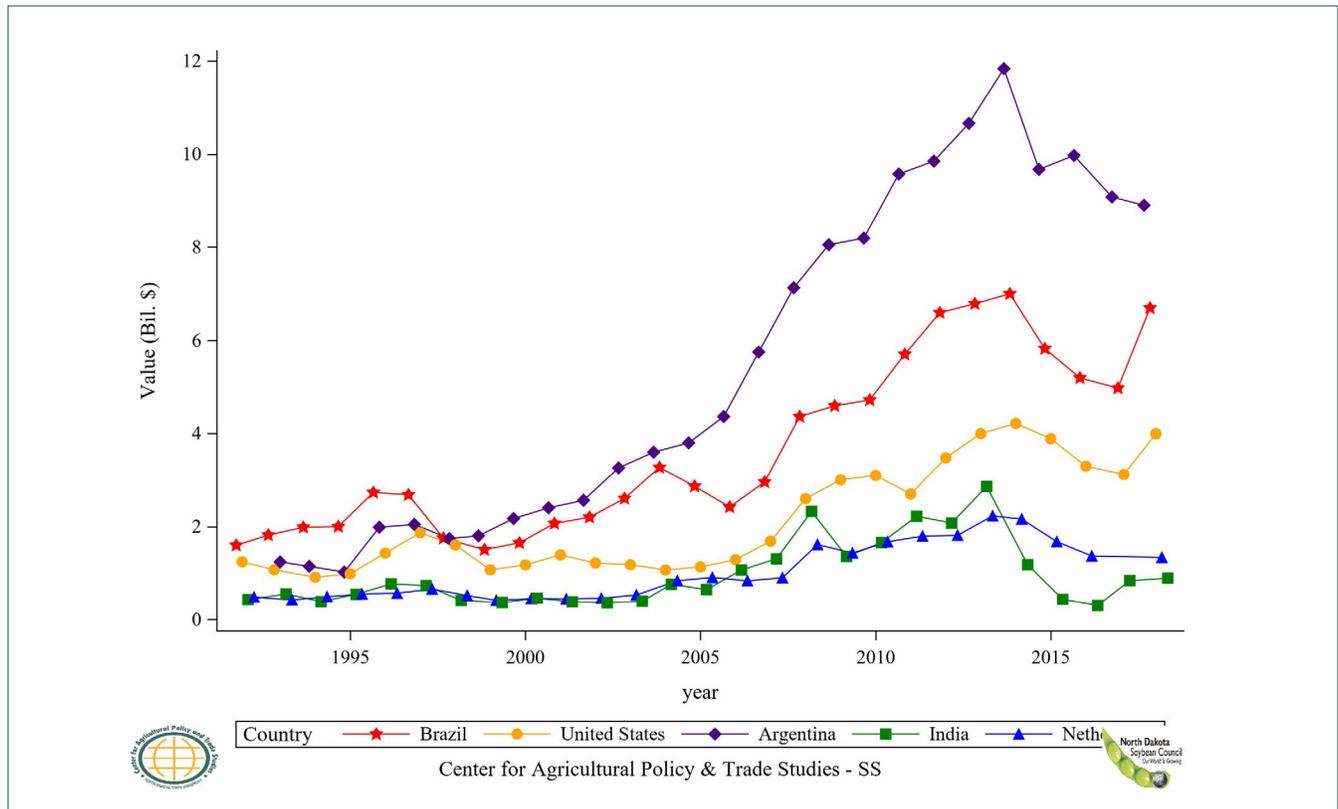
**Figure 21: Top 6 to 10 Countries Soybean Oil Refined Export Value, Annual Trends**



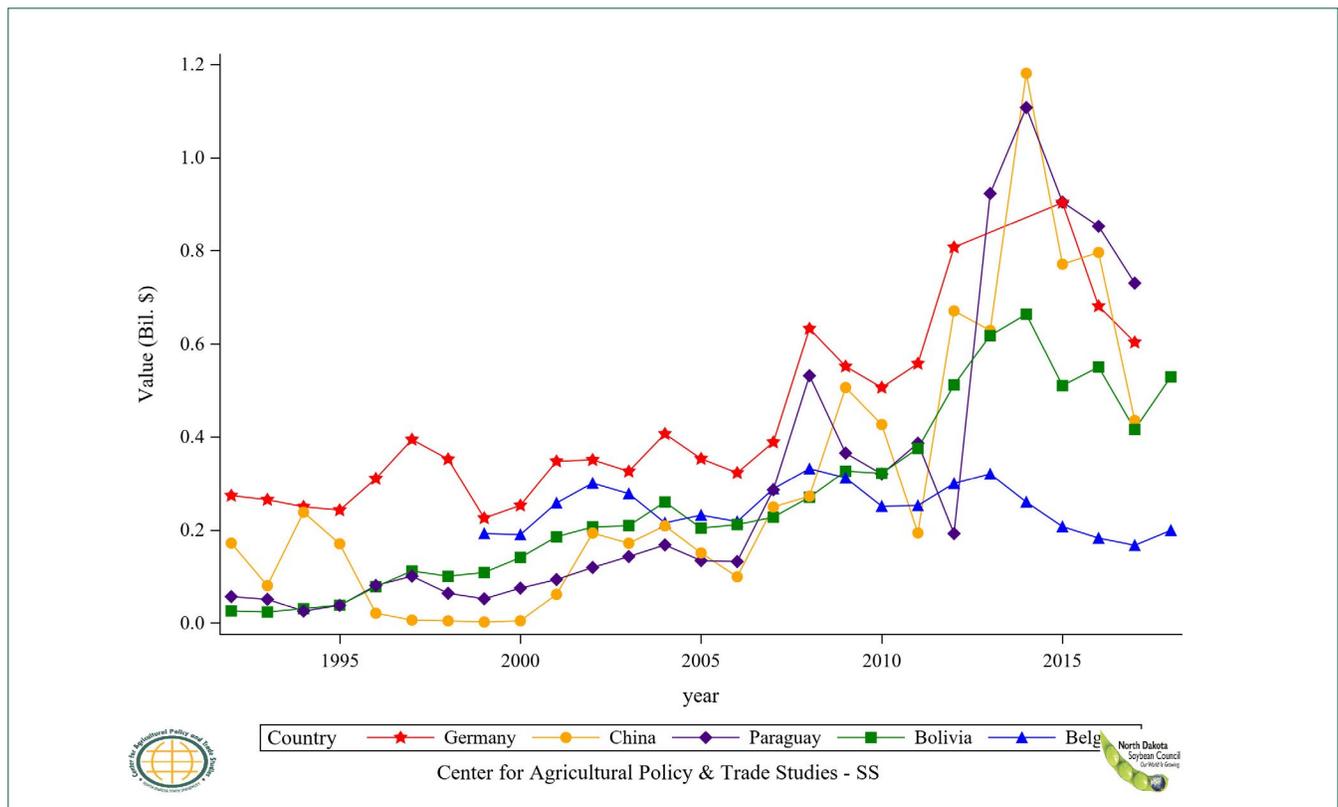
**Figure 22: Top 11 to 15 Countries Soybean Oil Refined Export Value, Annual Trends**



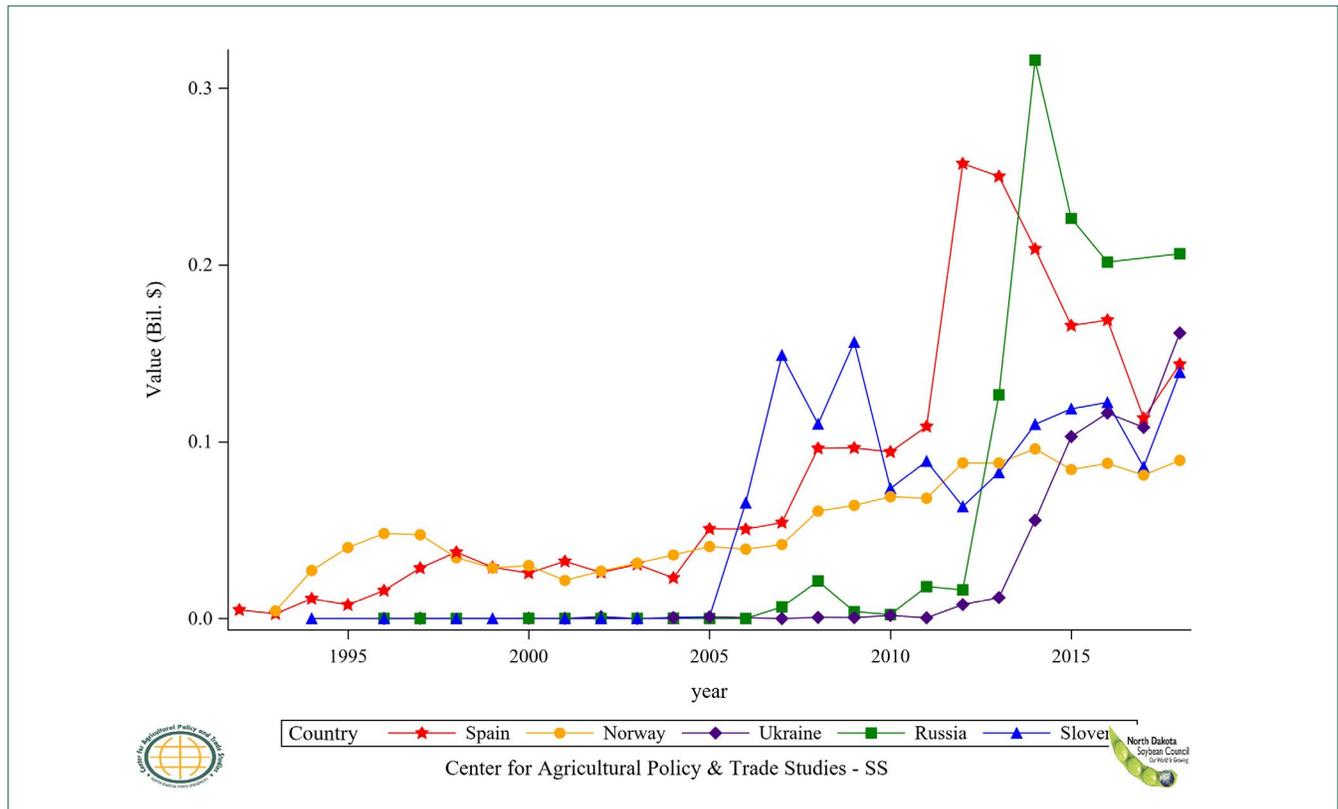
**Figure 23: Top 5 Countries Soybean Residue Export Value, Annual Trends**



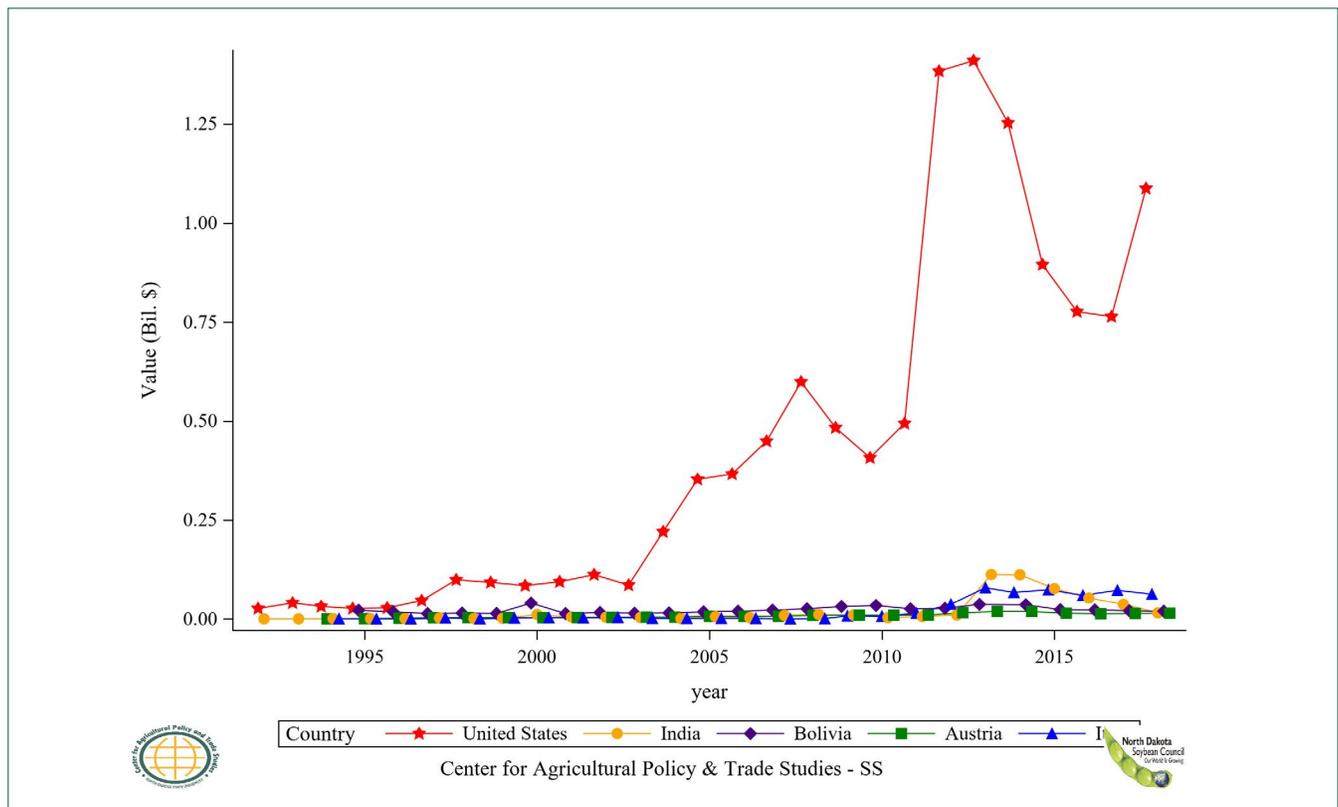
**Figure 24: Top 6 to 10 Countries Soybean Residue Export Value, Annual Trends**



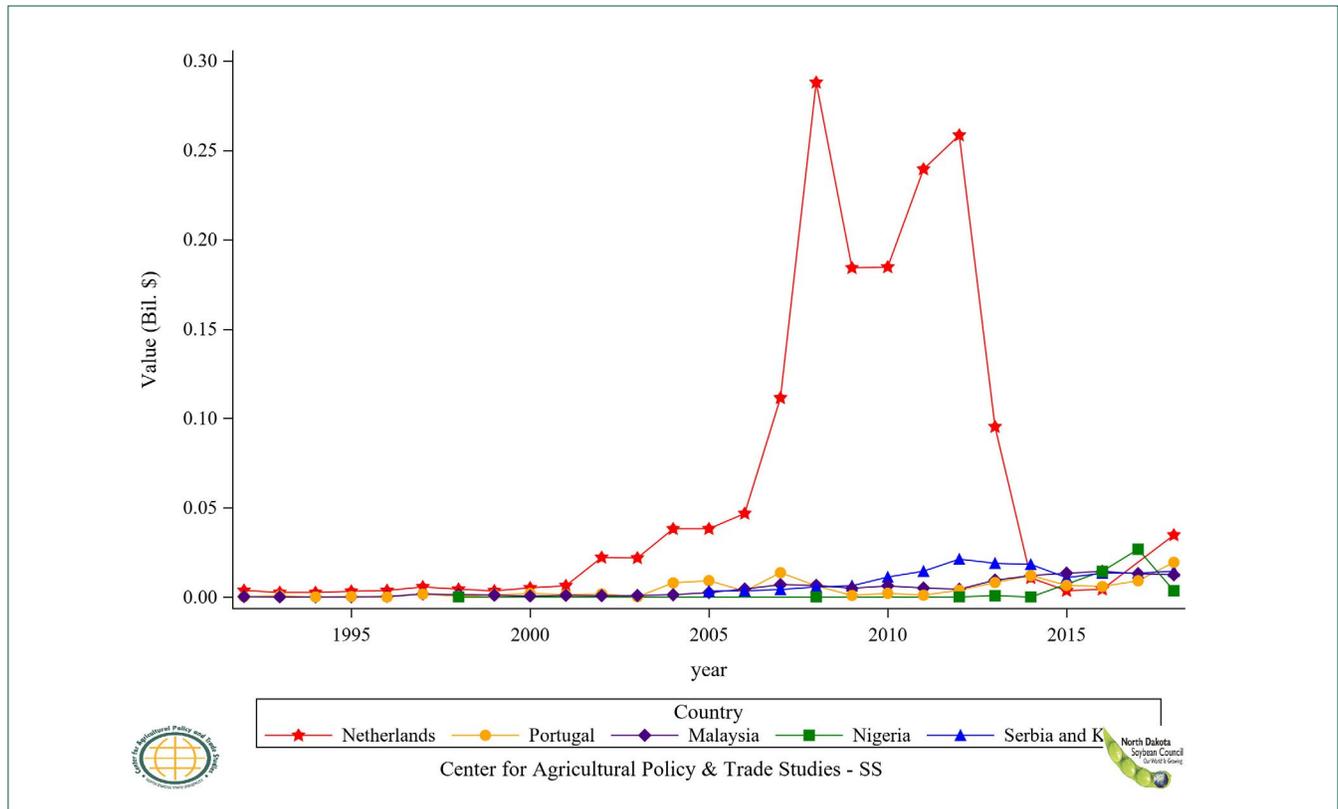
**Figure 25: Top 11 to 15 Countries Soybean Residue Export Value, Annual Trends**



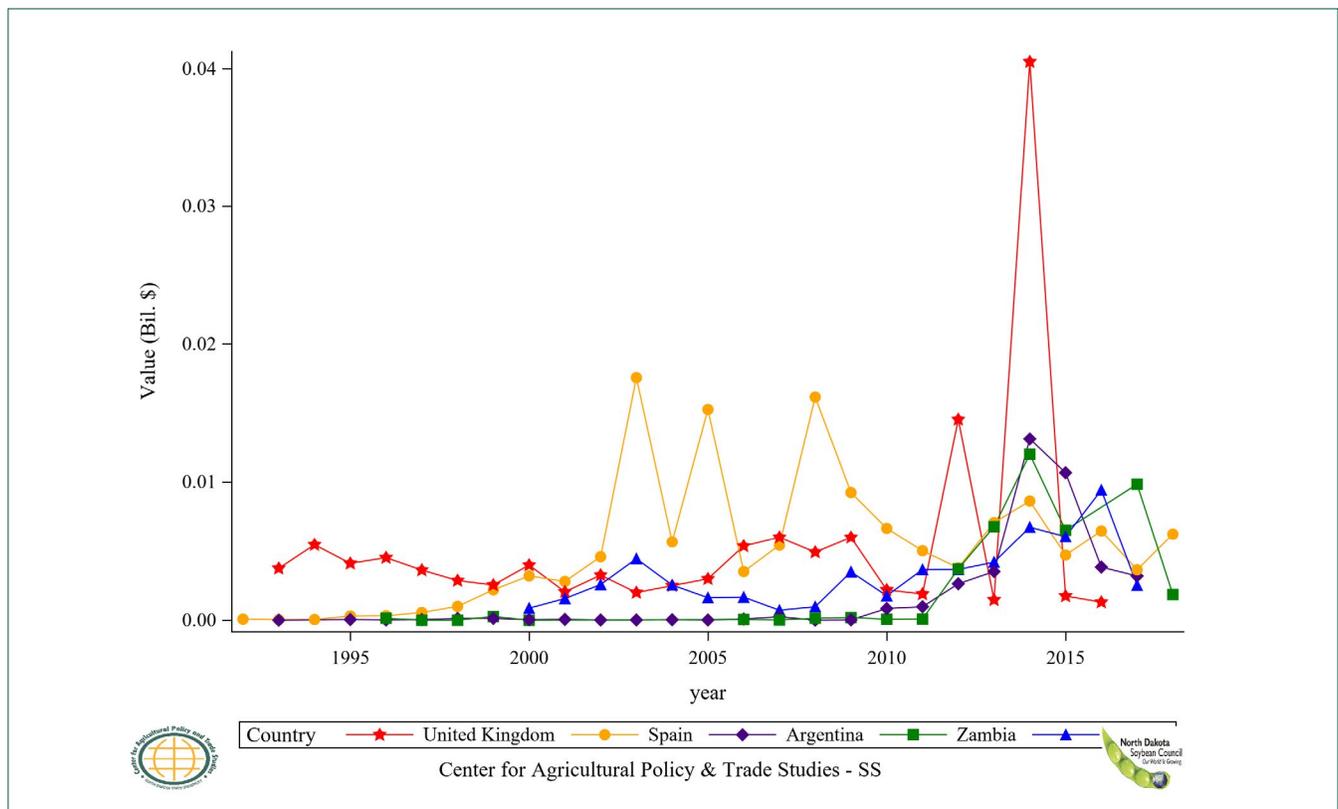
**Figure 26: Top 5 Countries Soybean Flour Export Value, Annual Trends**



**Figure 27: Top 6 to 10 Countries Soybean Flour Export Value, Annual Trends**



**Figure 28: Top 11 to 15 Countries Soybean Flour Export Value, Annual Trends**

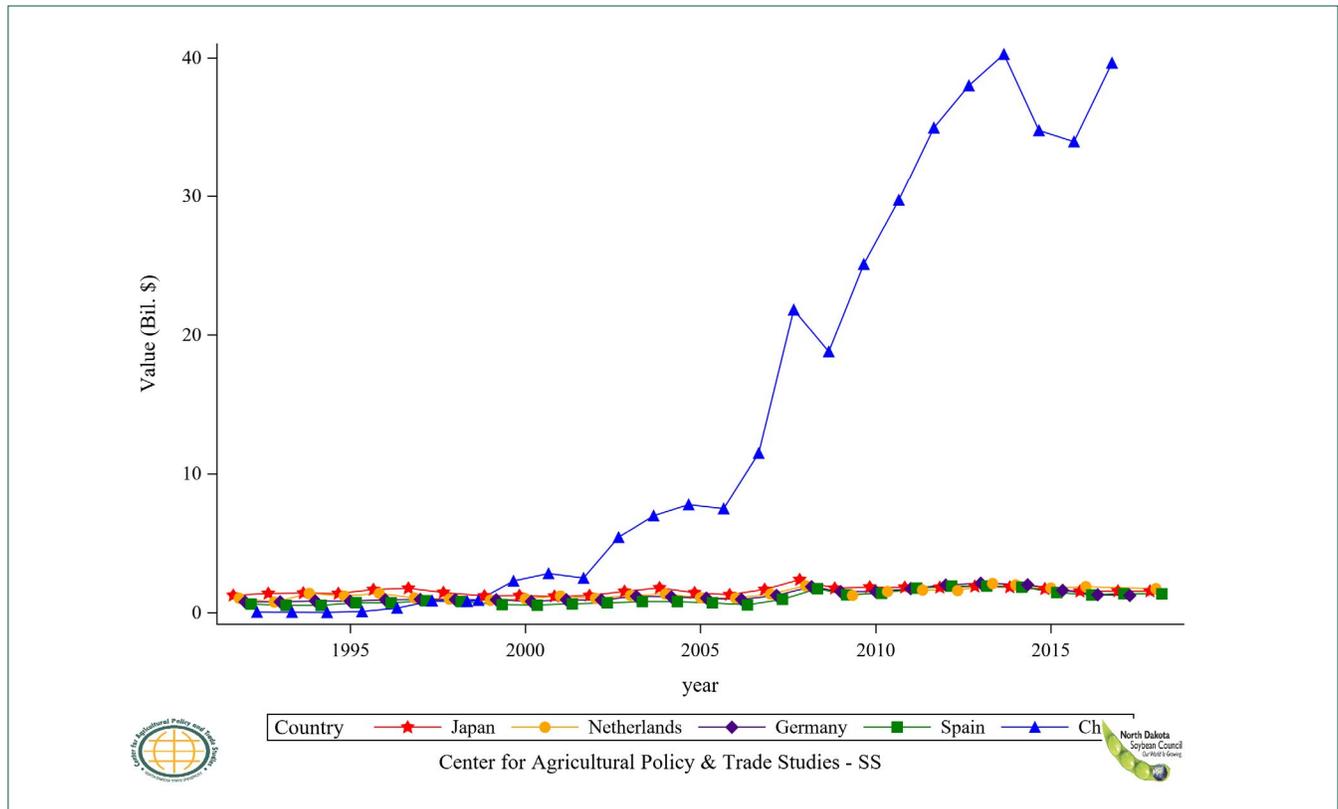


■ Section III

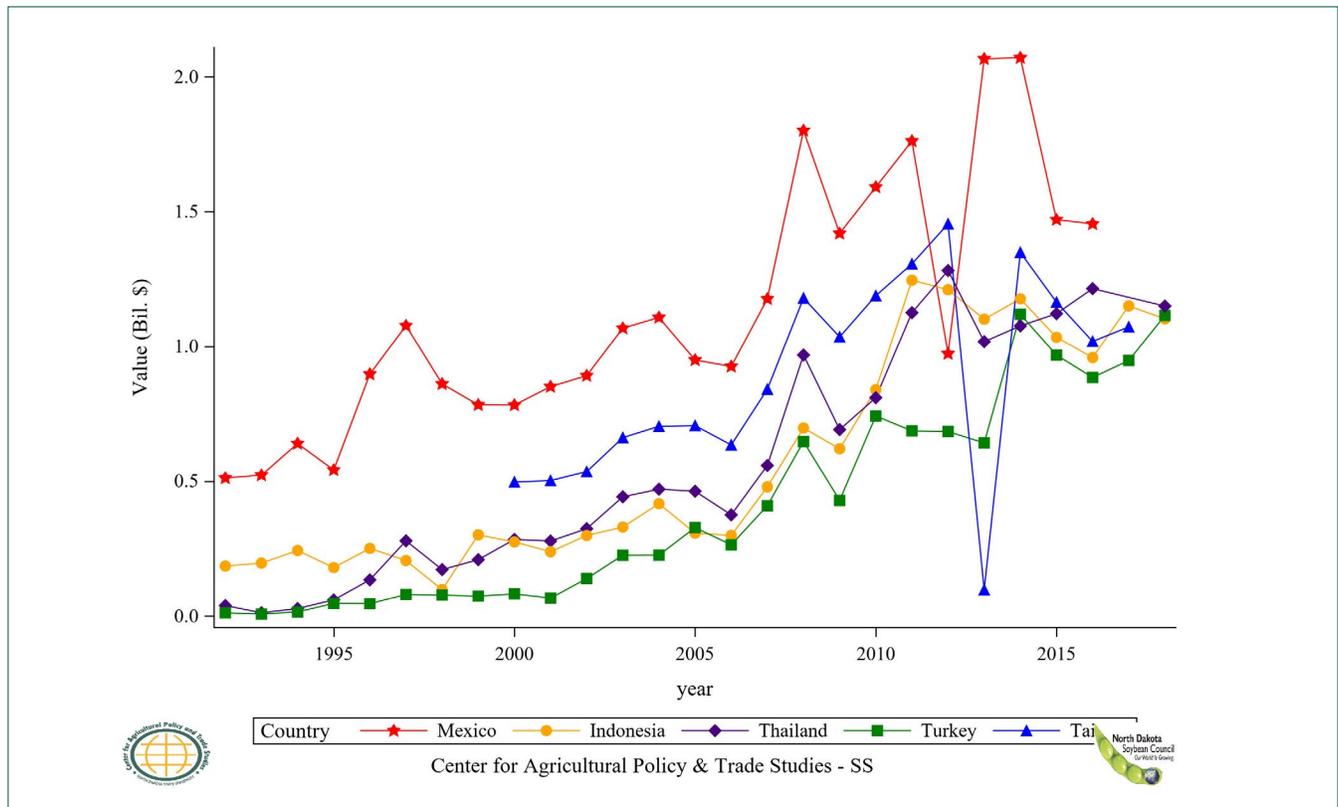
# Global Spatial Soybean Import

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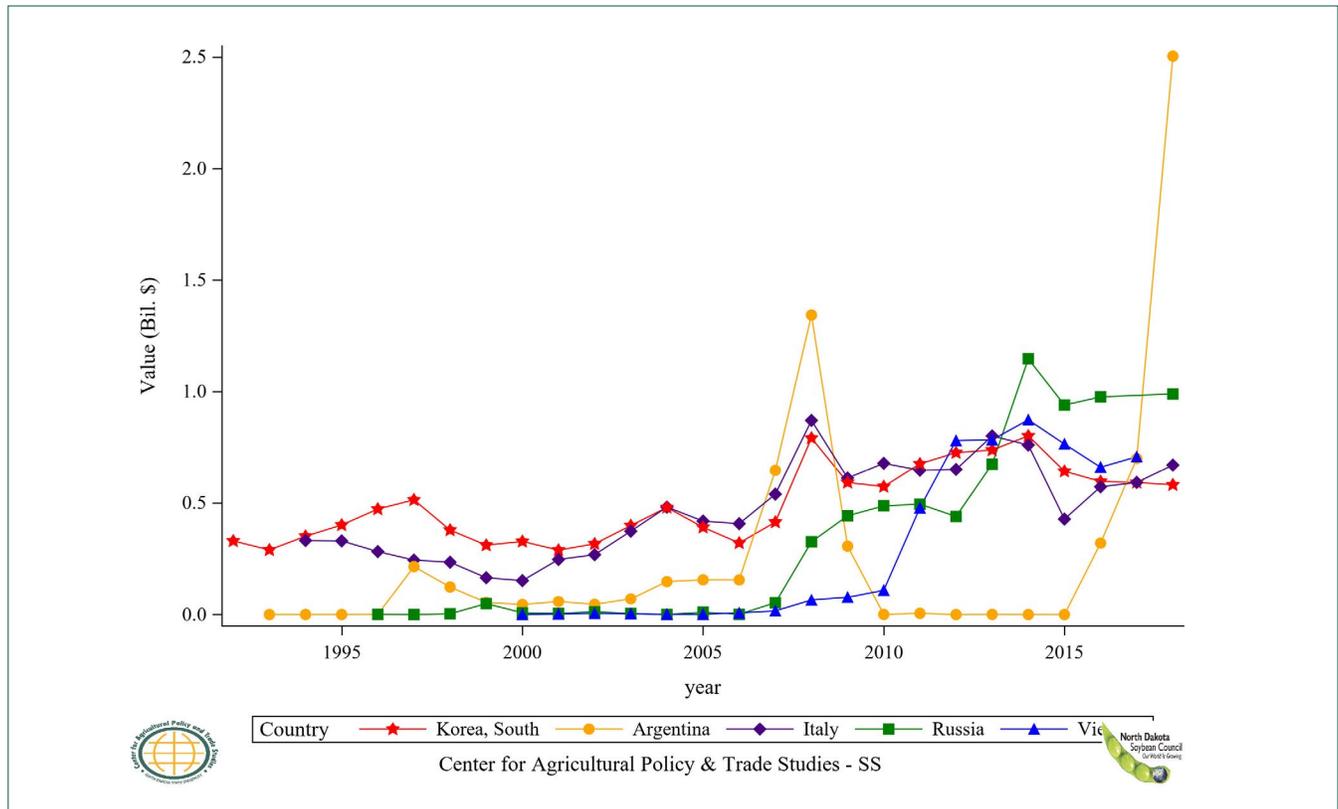
**Figure 29: Top 5 Countries Soybean Import Value, Annual Trends**



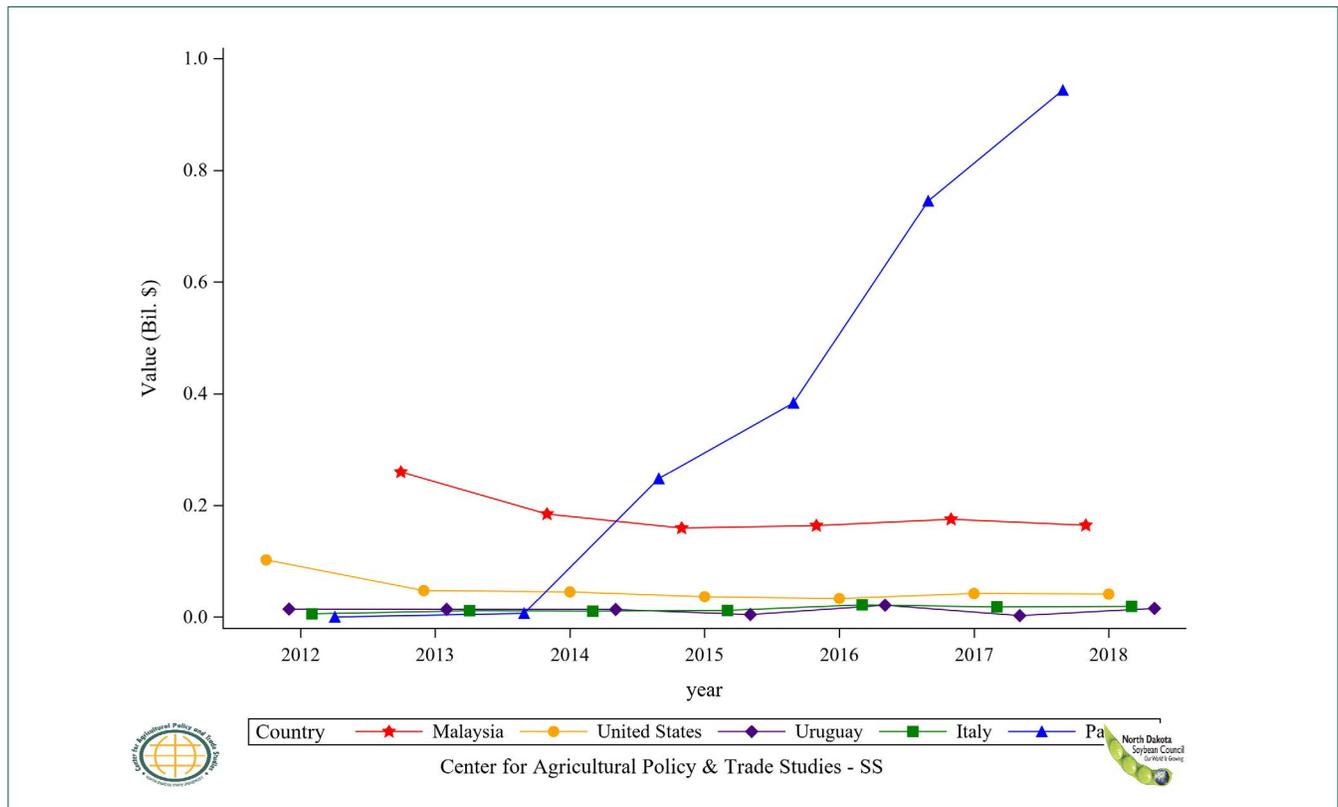
**Figure 30: Top 6 to 10 Countries Soybean Import Value, Annual Trends**



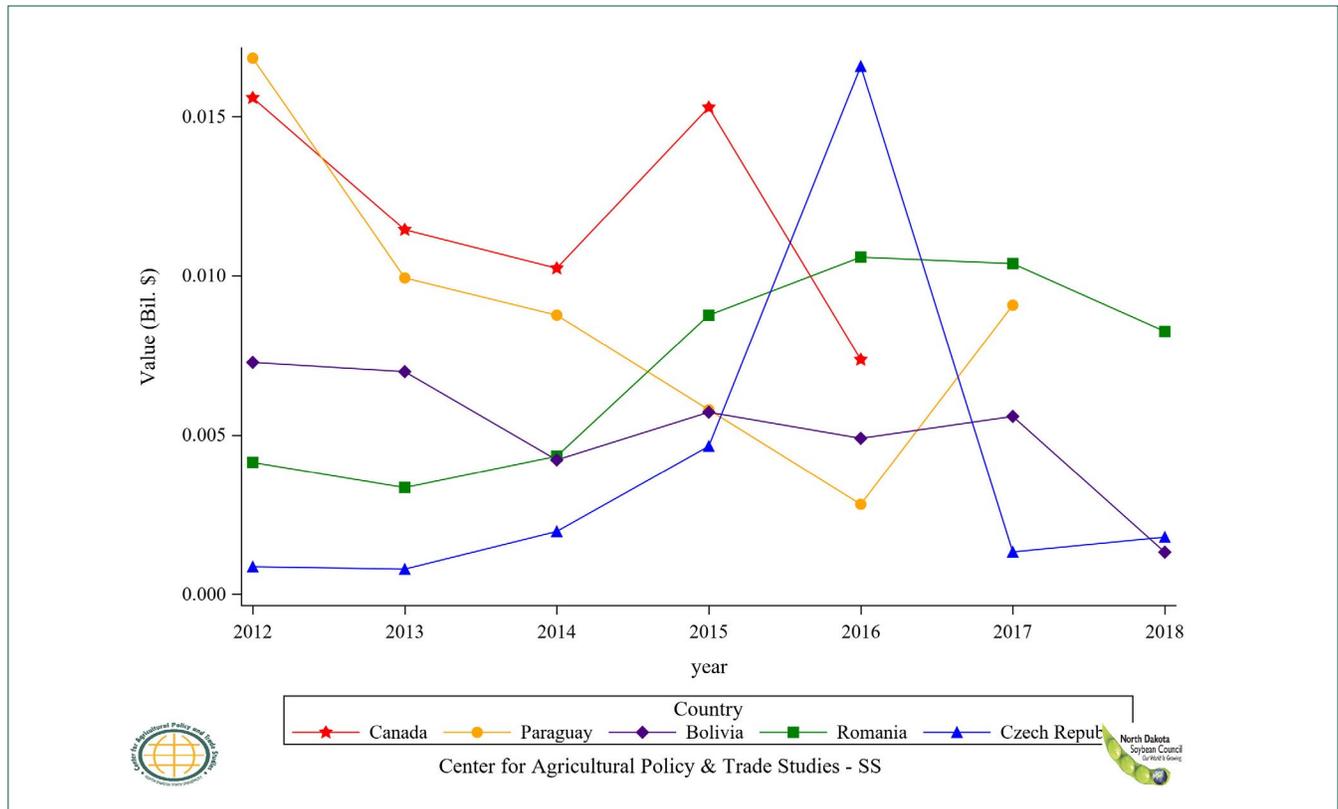
**Figure 31: Top 11 to 15 Countries Soybean Import Value, Annual Trends**



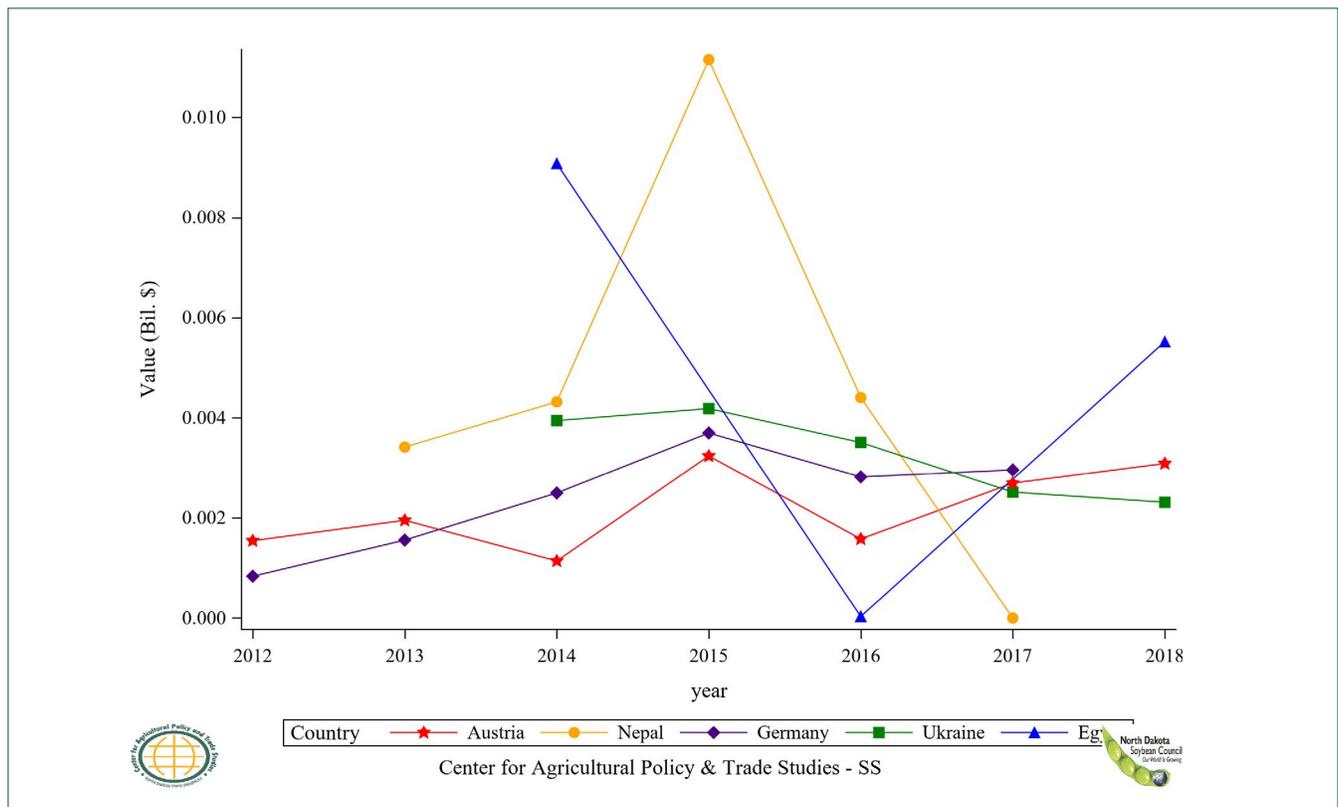
**Figure 32: Top 5 Countries Soybean, Seed Import Value, Annual Trends**



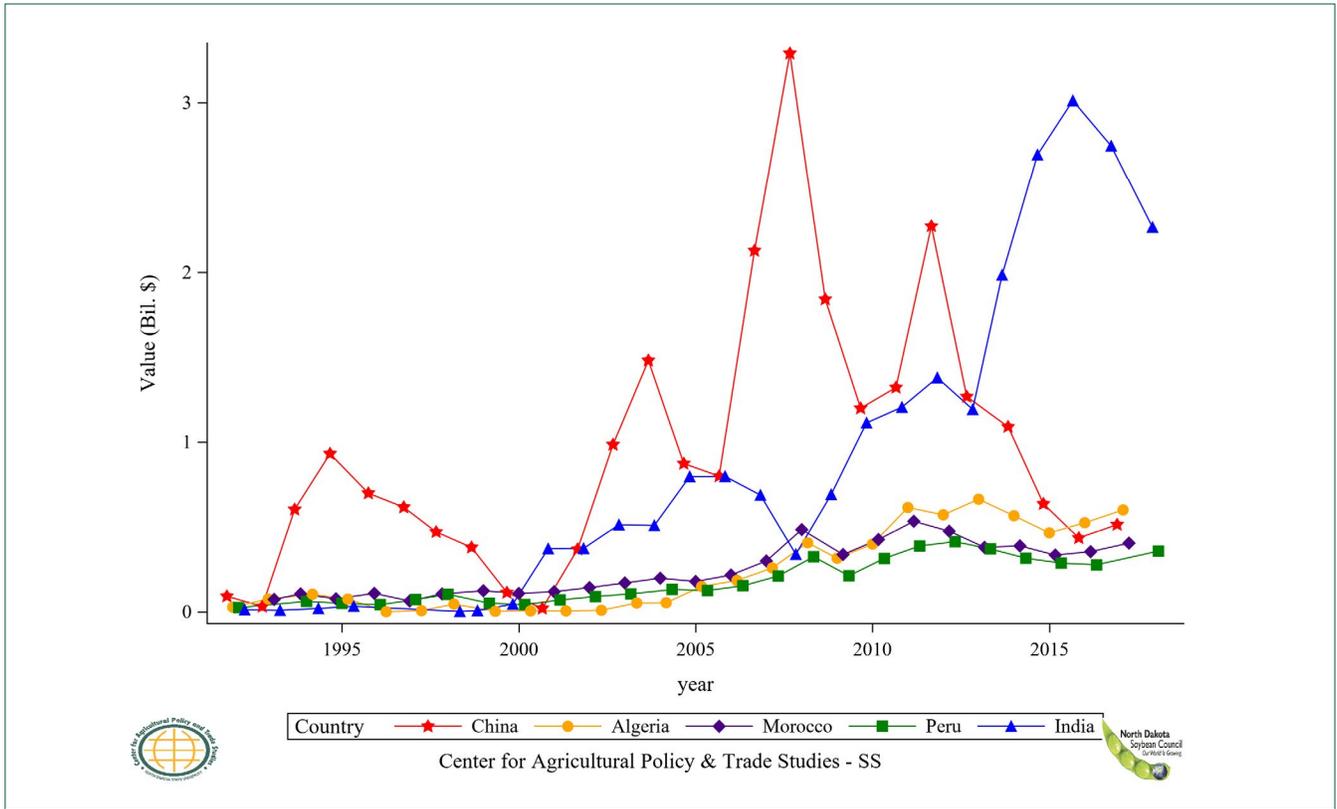
**Figure 33: Top 6 to 10 Countries Soybean, Seed Import Value, Annual Trends**



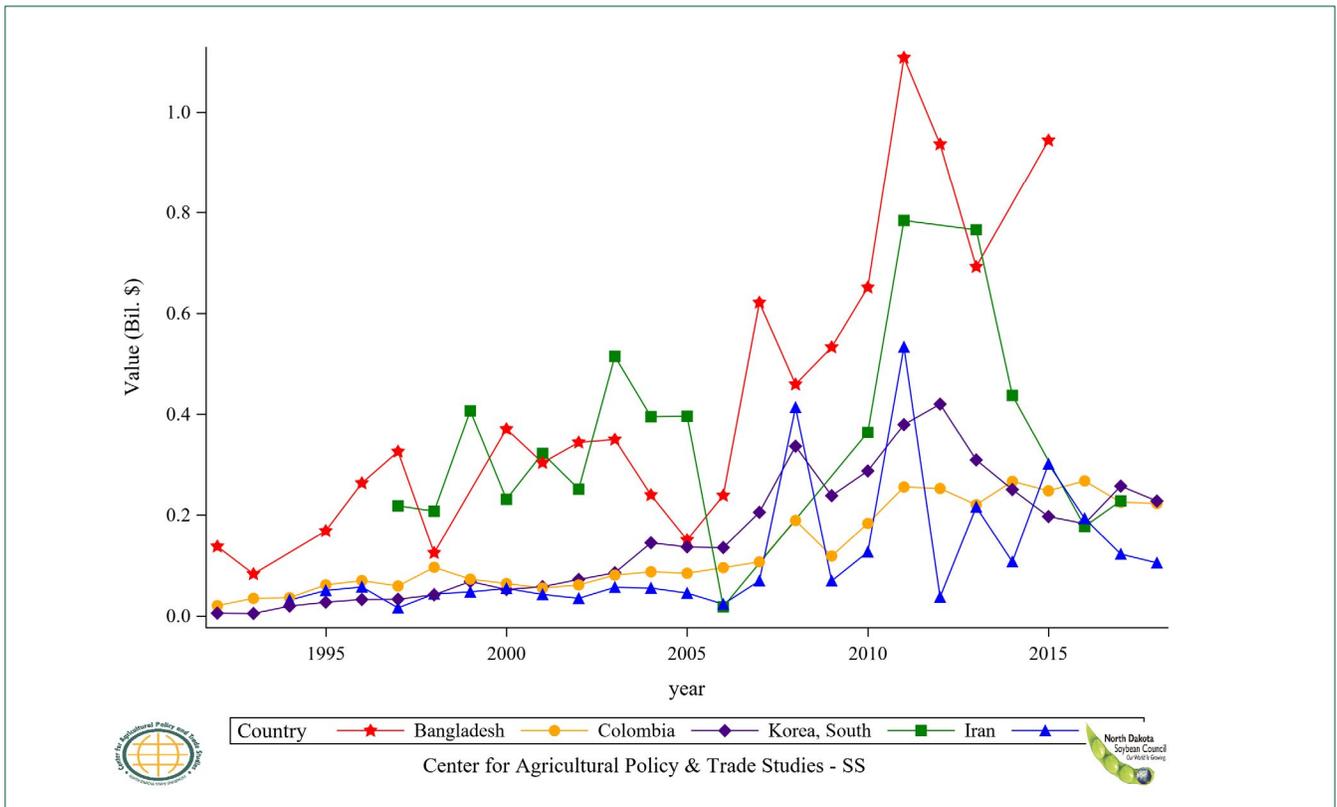
**Figure 34: Top 11 to 15 Countries Soybean, Seed Import Value, Annual Trends**



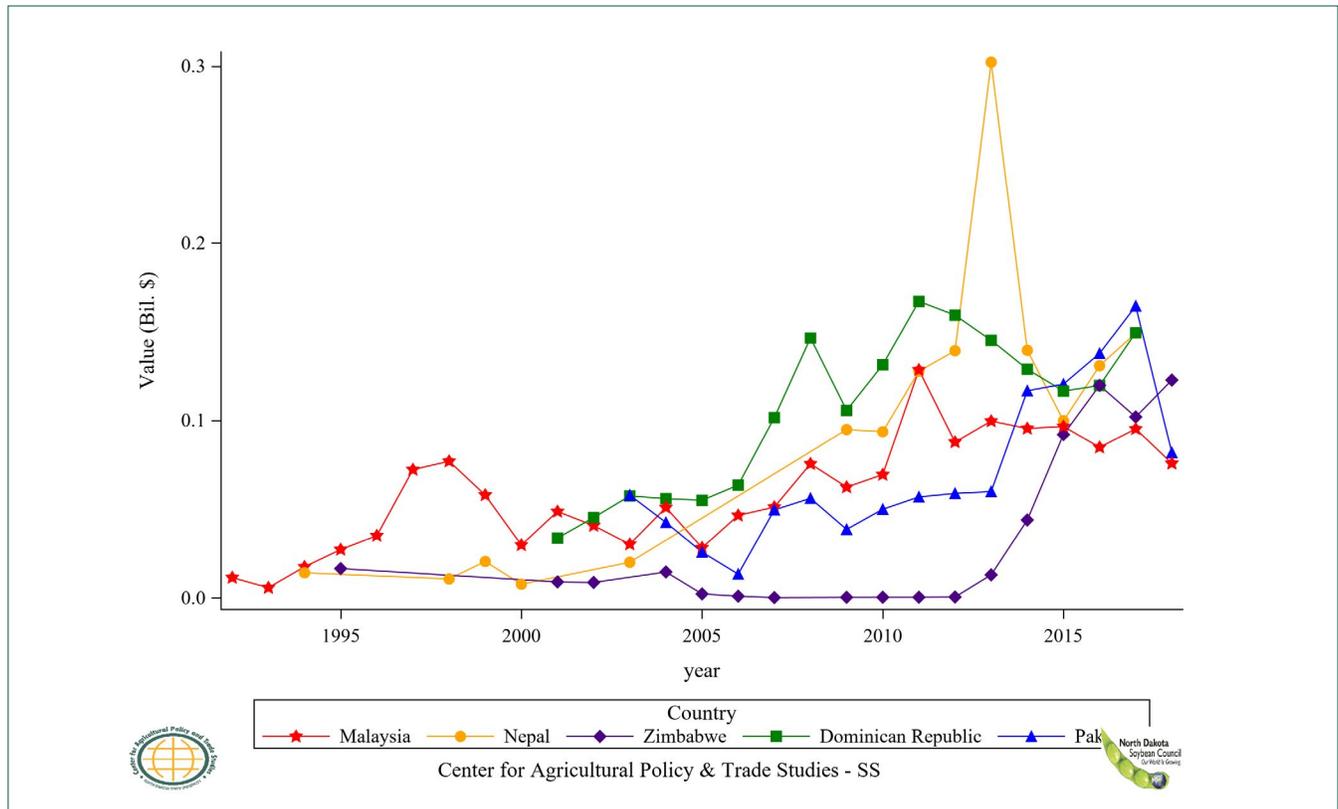
**Figure 35: Top 5 Countries Soybean Oil Crude Import Value, Annual Trends**



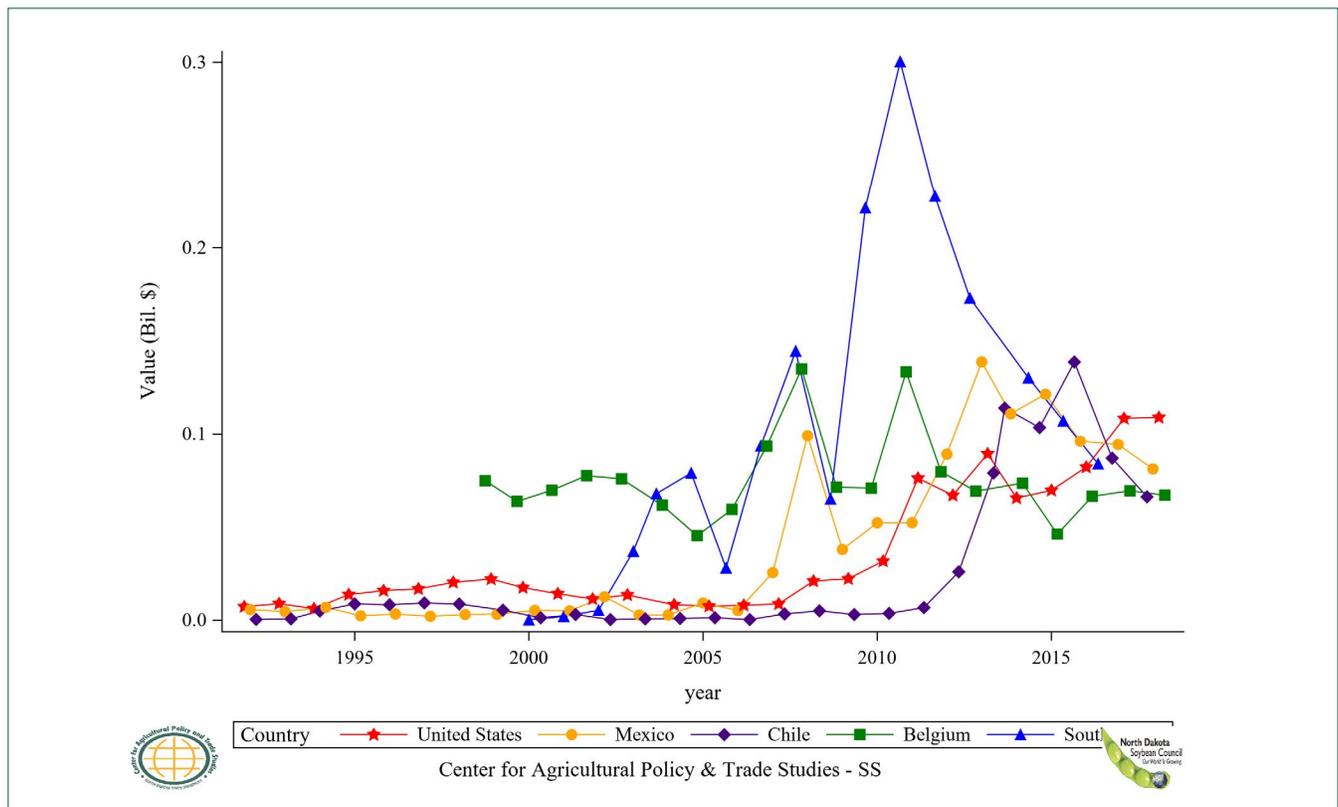
**Figure 36: Top 6 to 10 Countries Soybean Oil Crude Import Value, Annual Trends**



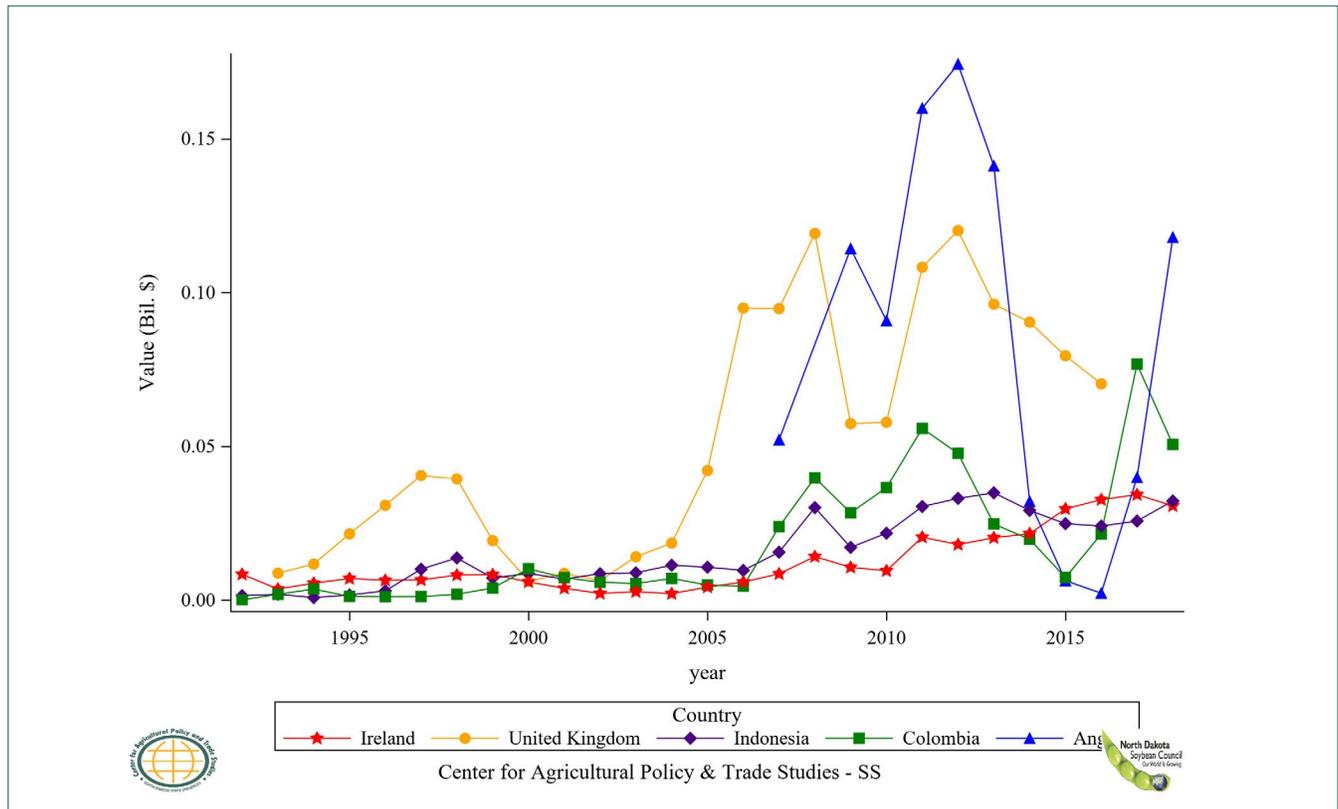
**Figure 37: Top 11 to 15 Countries Soybean Oil Crude Import Value, Annual Trends**



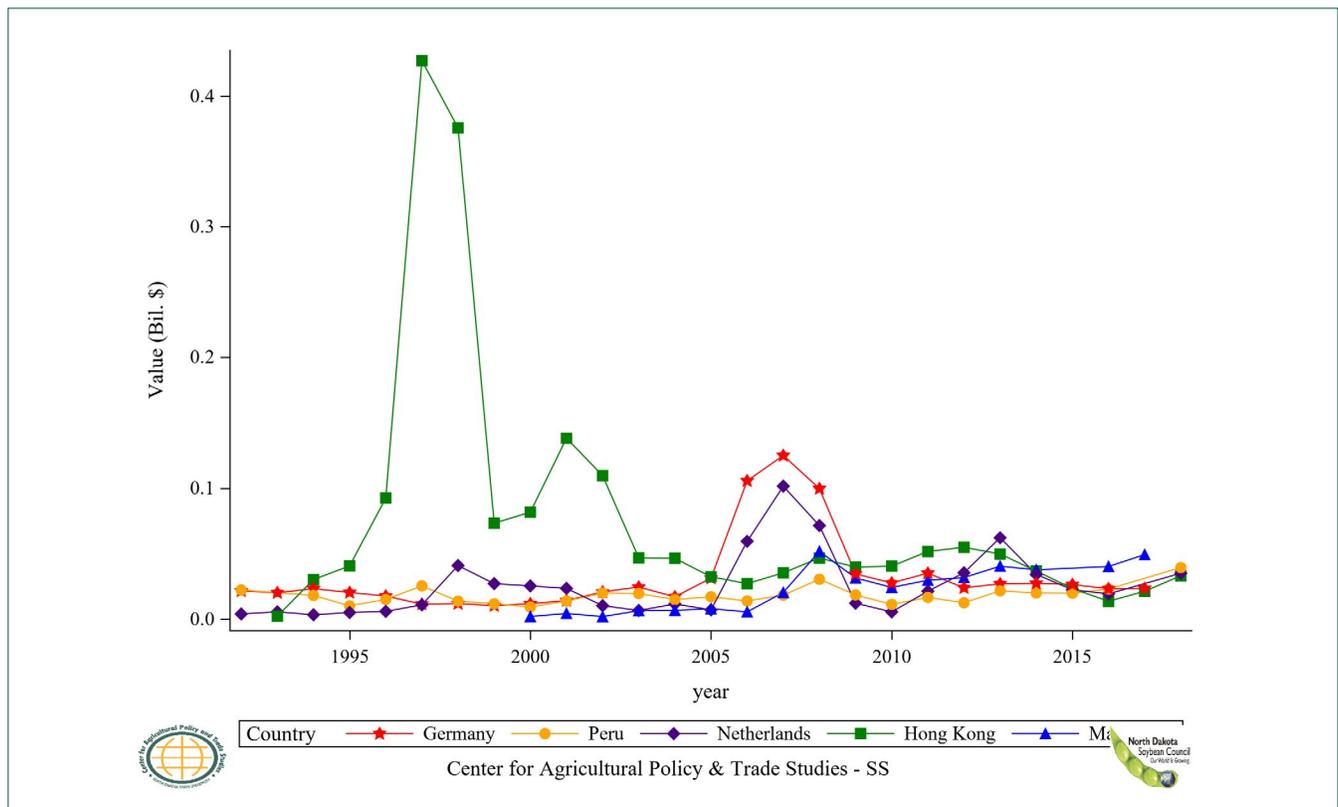
**Figure 38: Top 5 Countries Soybean Oil Refined Import Value, Annual Trends**



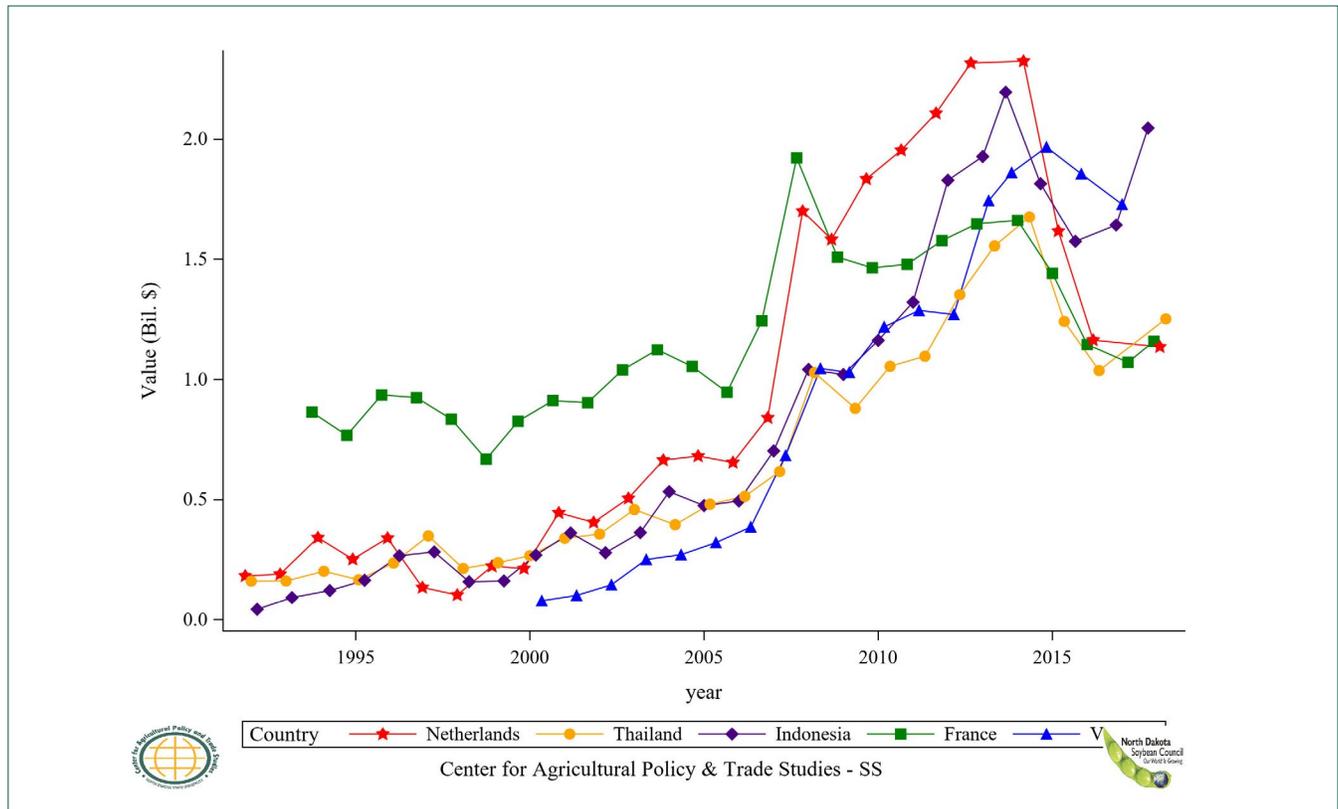
**Figure 39: Top 6 to 10 Countries Soybean Oil Refined Import Value, Annual Trends**



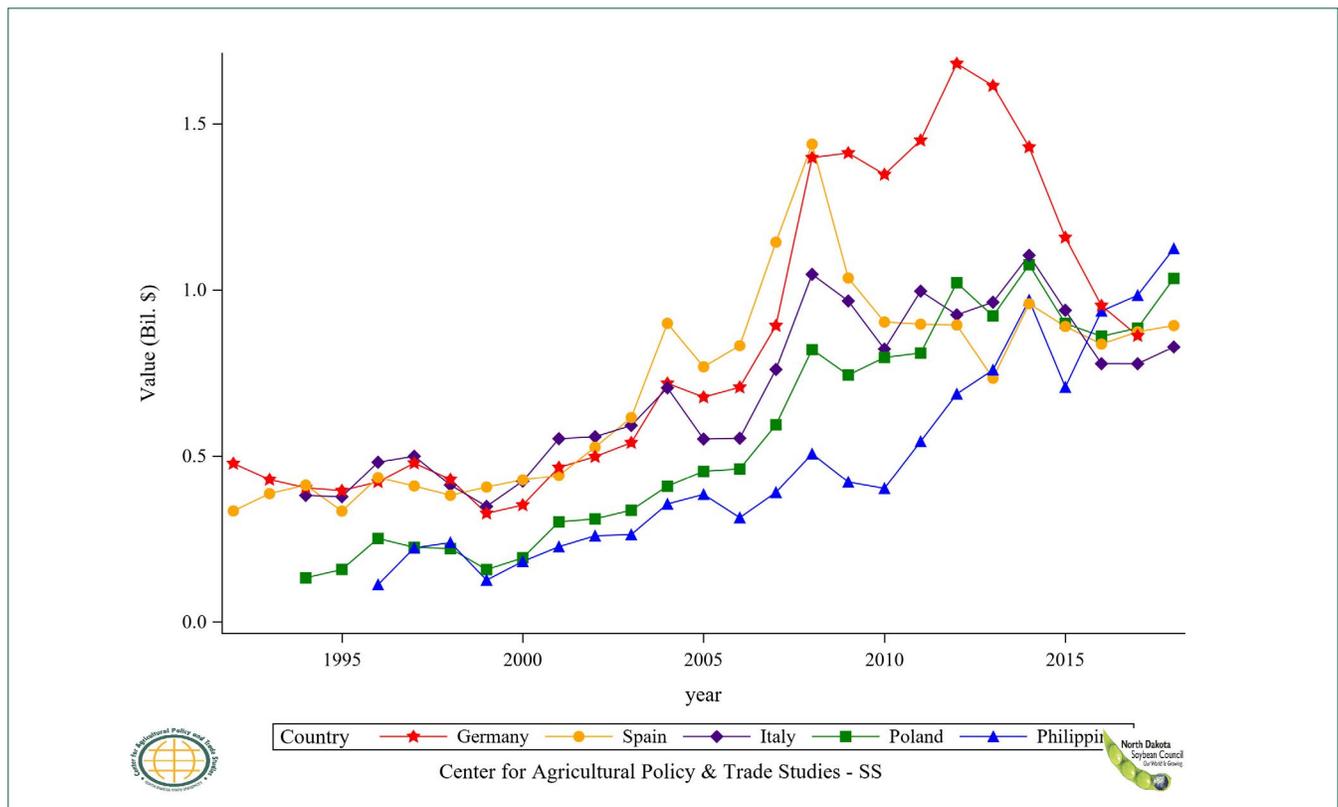
**Figure 40: Top 11 to 15 Countries Soybean Oil Refined Import Value, Annual Trends**



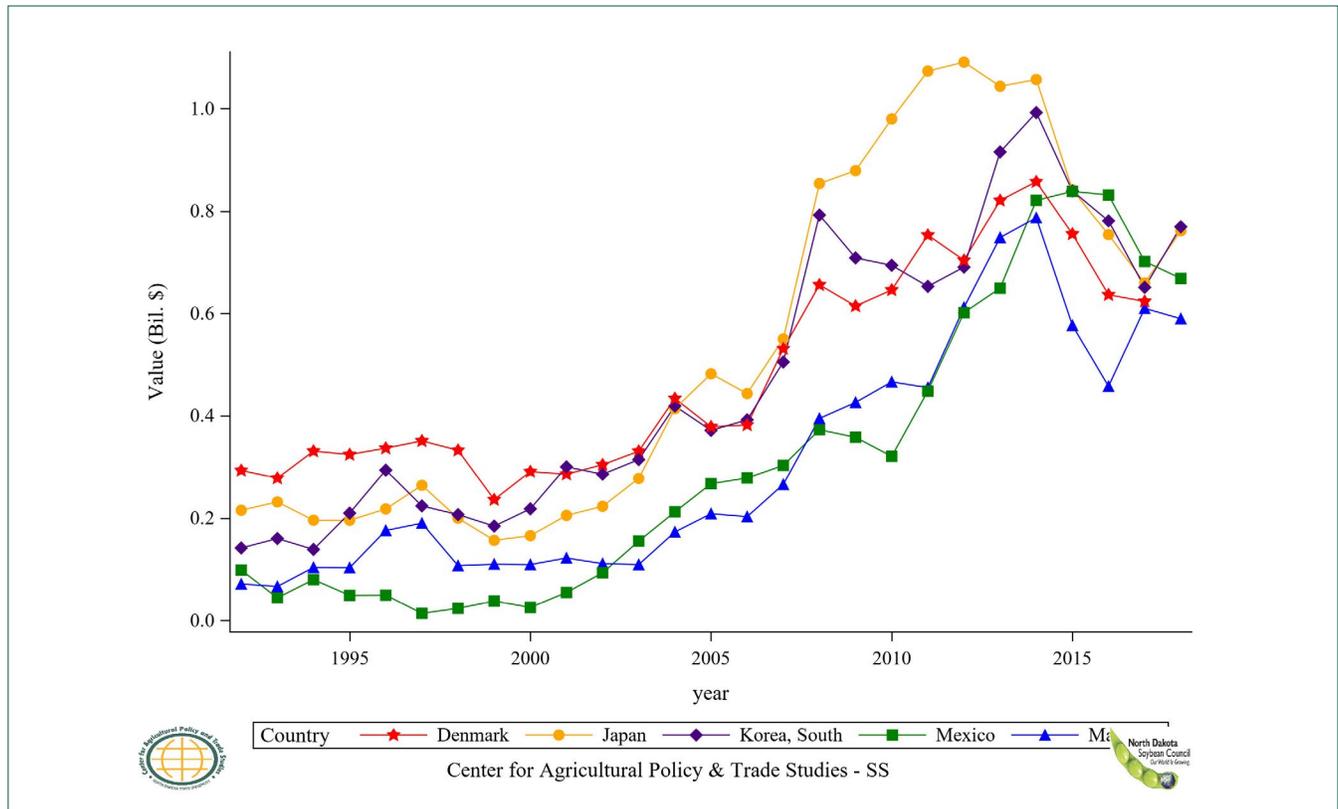
**Figure 41: Top 5 Countries Soybean Residue Import Value, Annual Trends**



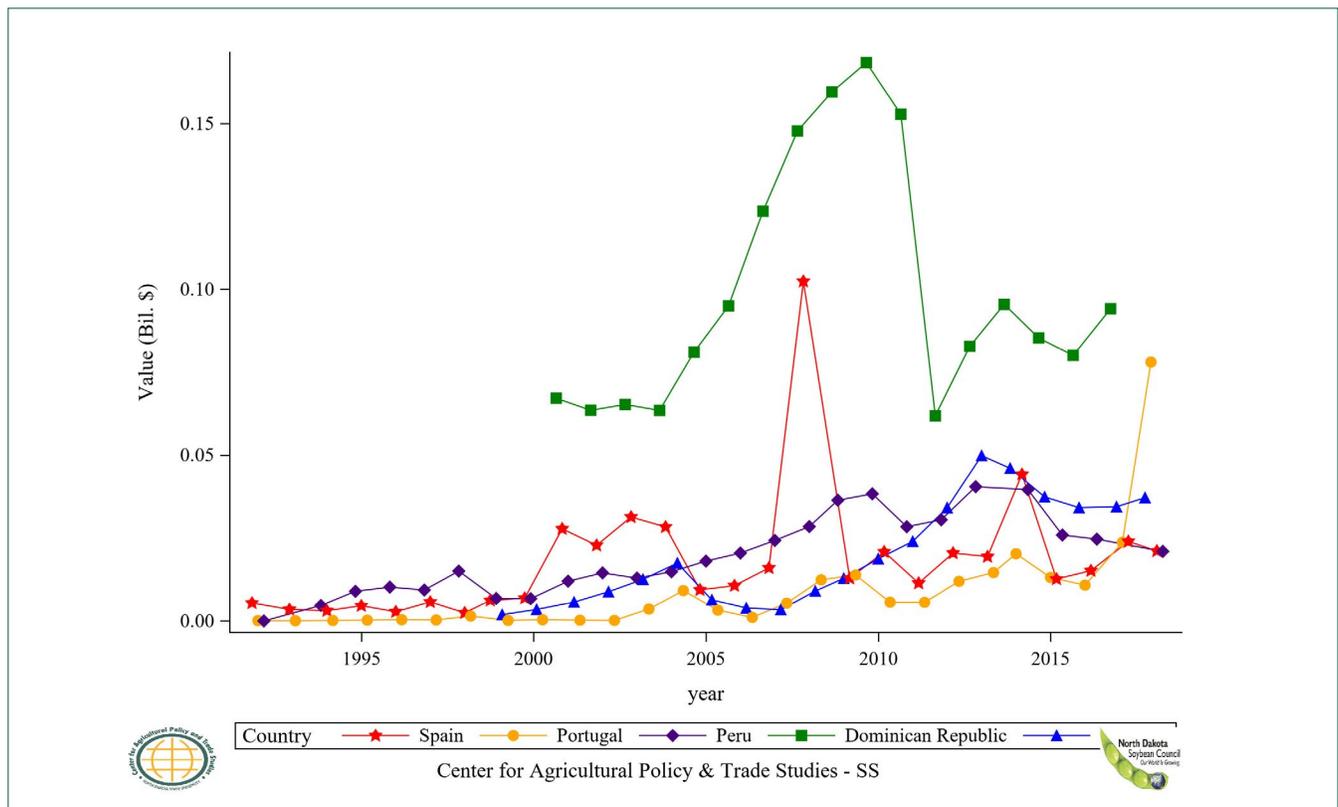
**Figure 42: Top 6 to 10 Countries Soybean Residue Import Value, Annual Trends**



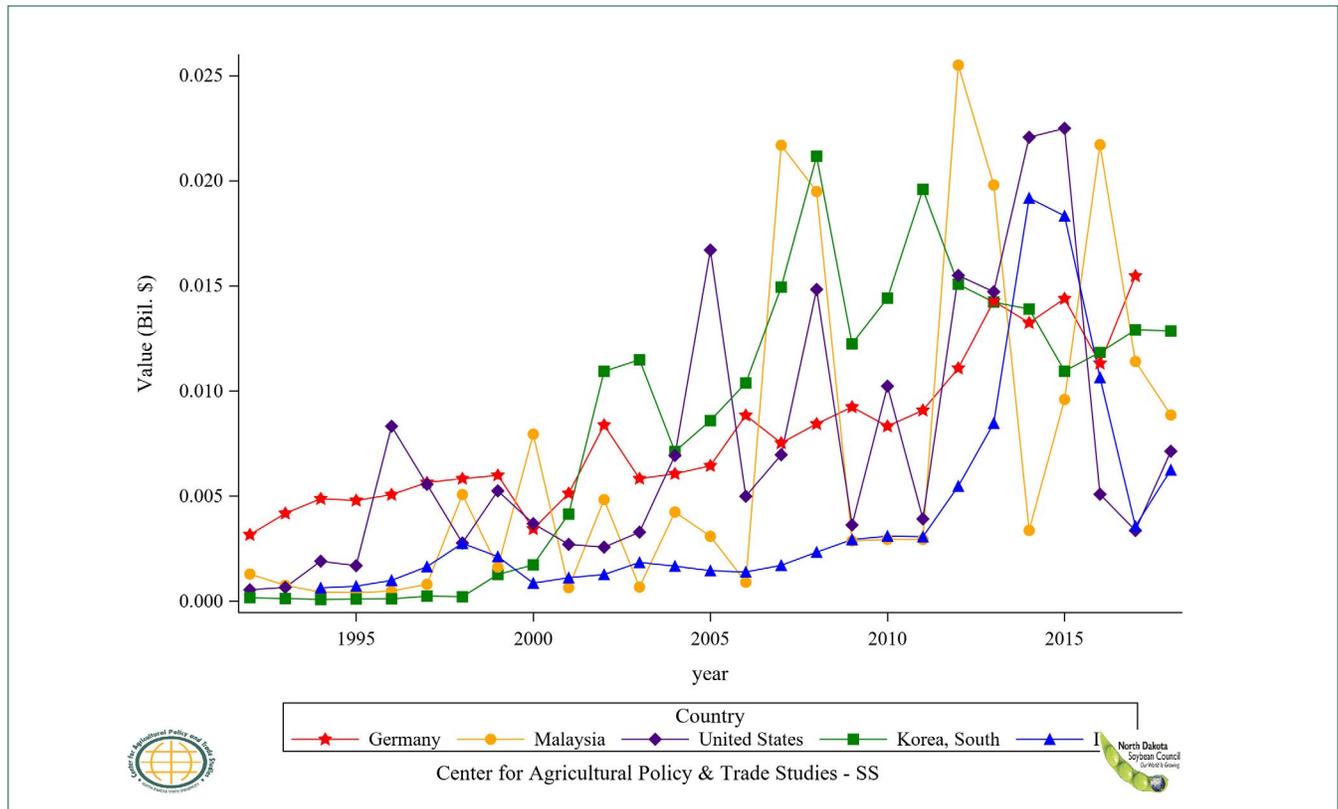
**Figure 43: Top 11 to 15 Countries Soybean Residue Import Value, Annual Trends**



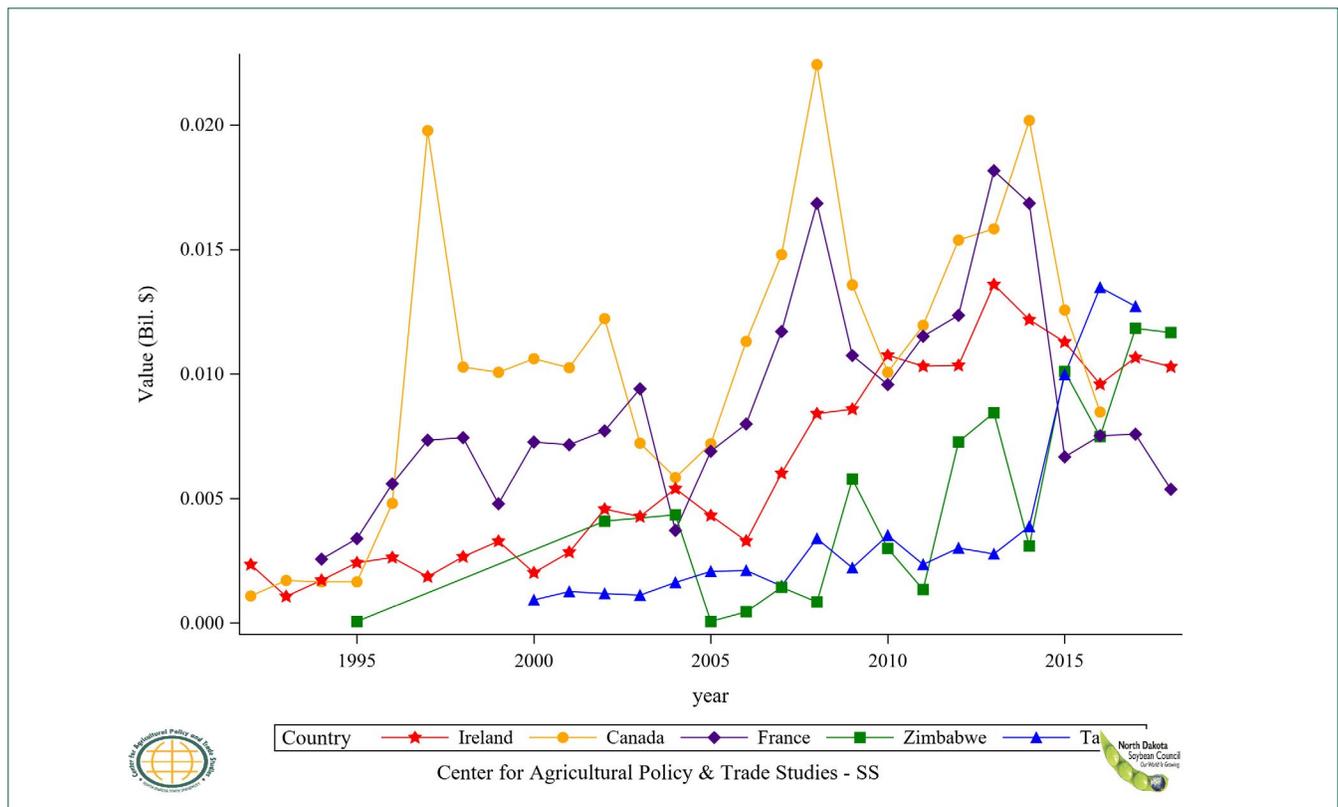
**Figure 44: Top 5 Countries Soybean Flour Import Value, Annual Trends**



**Figure 45: Top 6 to 10 Countries Soybean Flour Import Value, Annual Trends**



**Figure 46: Top 11 to 15 Countries Soybean Flour Import Value, Annual Trends**

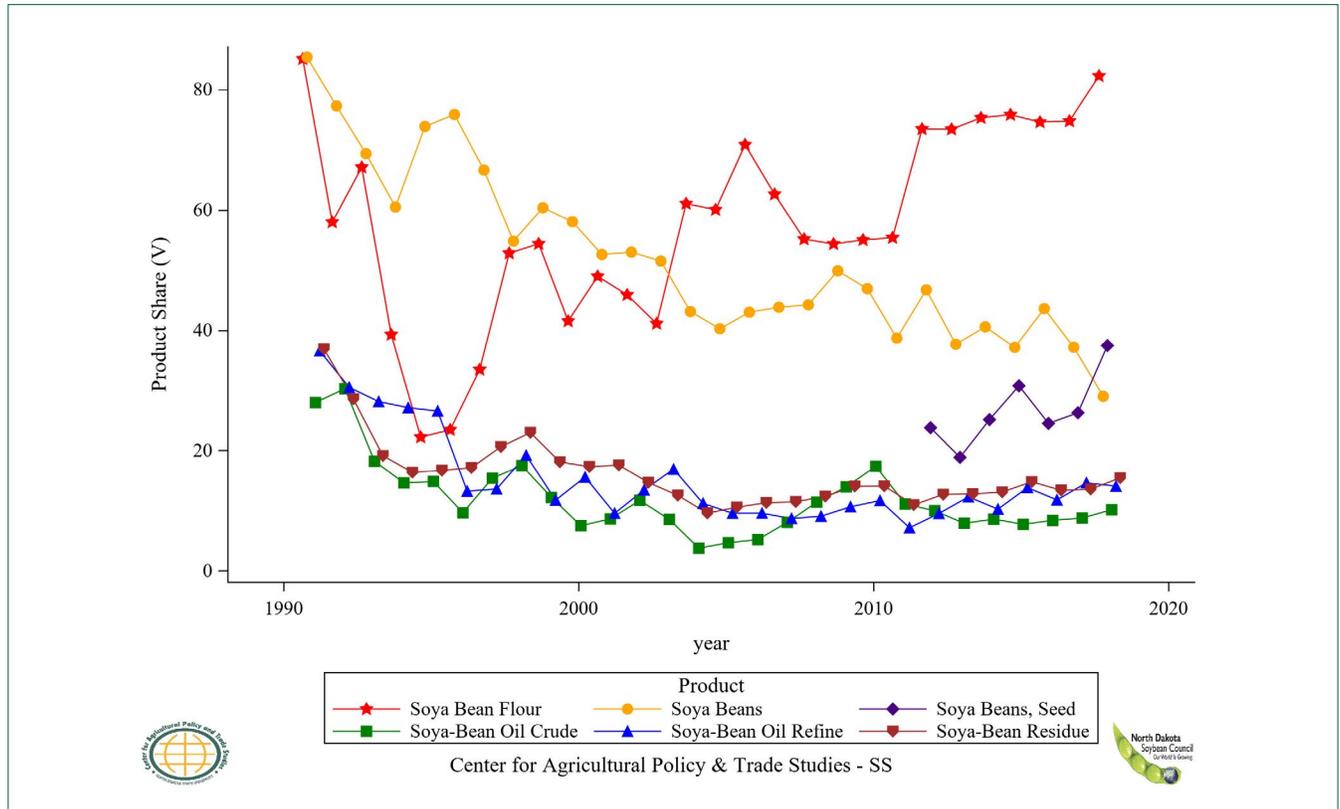


■ Section IV

# **U.S. Temporal Soybean Export**

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**Figure 47: U.S. Share of Exports Relative to the World, Annual Trends**

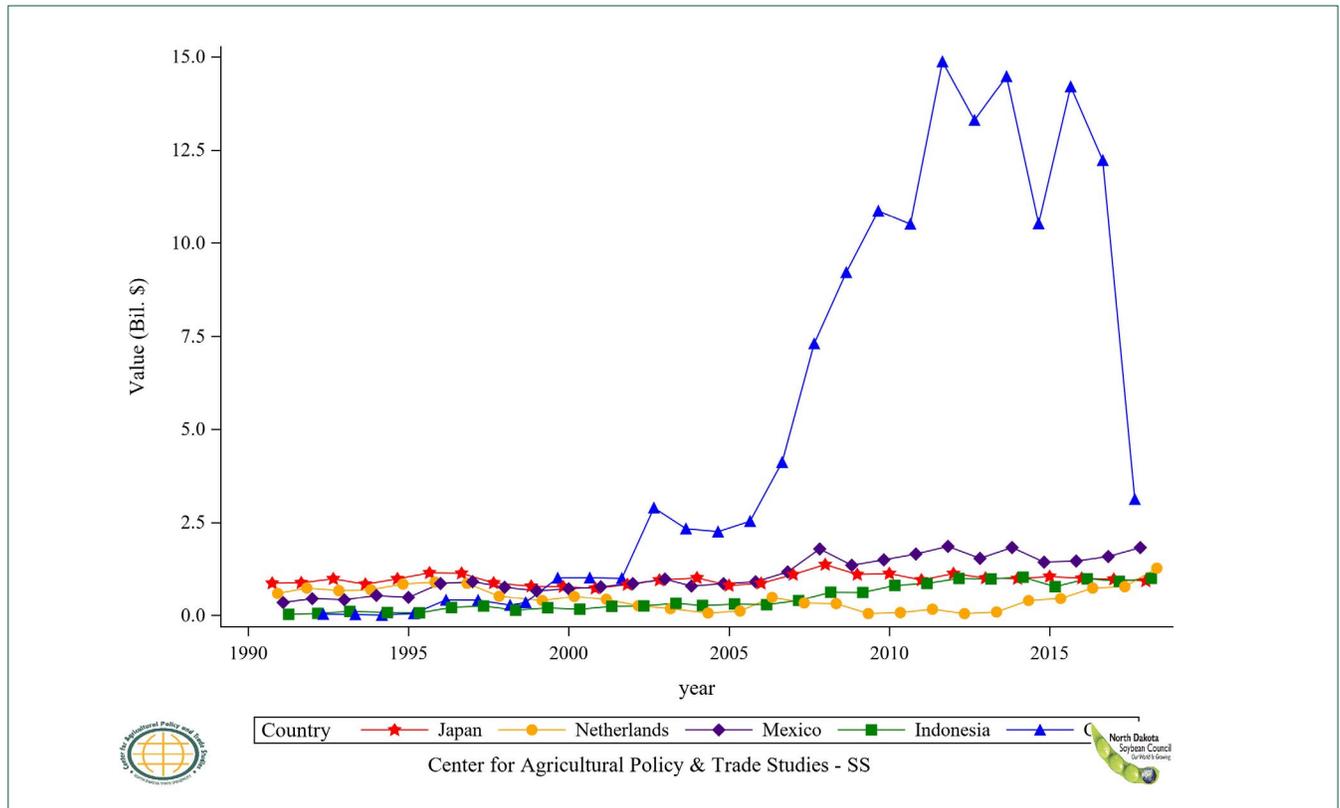


■ Section V

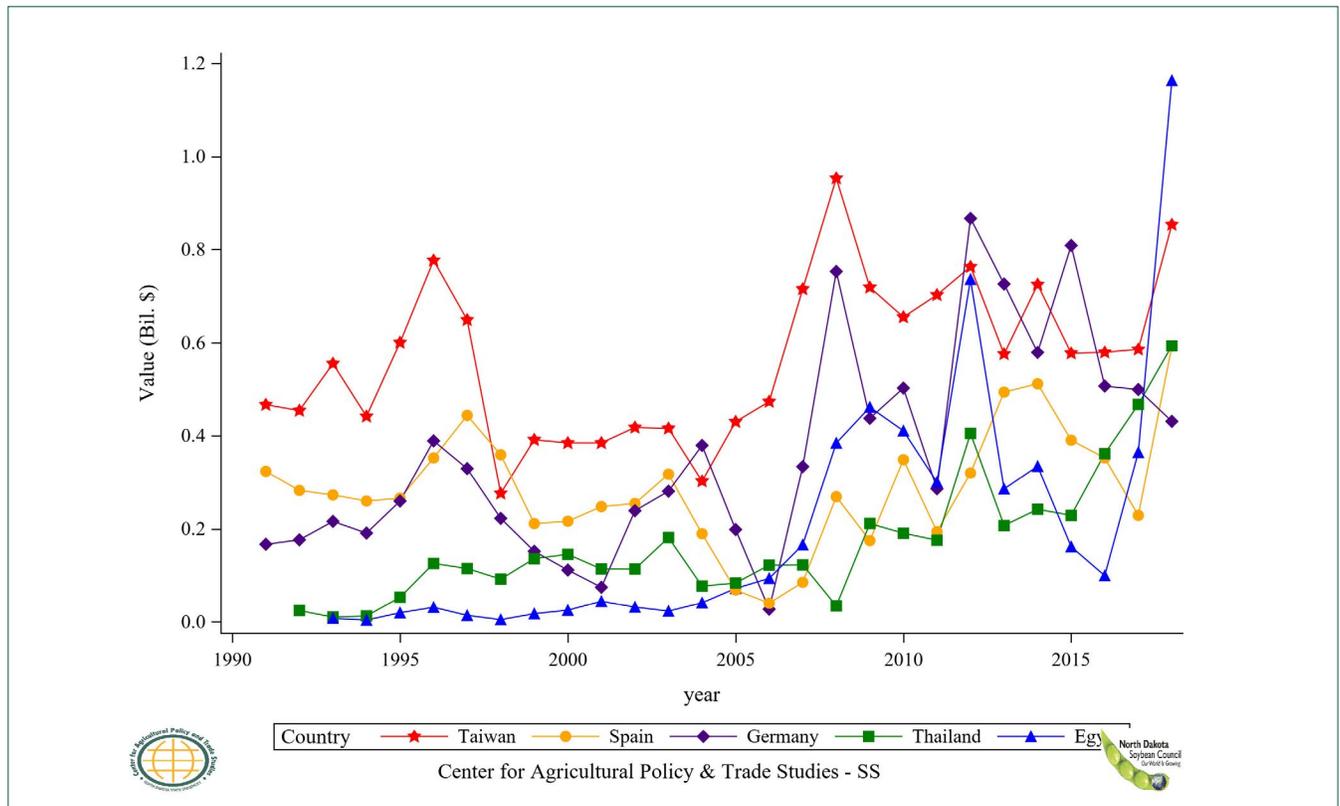
# **U.S. Spatial Soybean Export**

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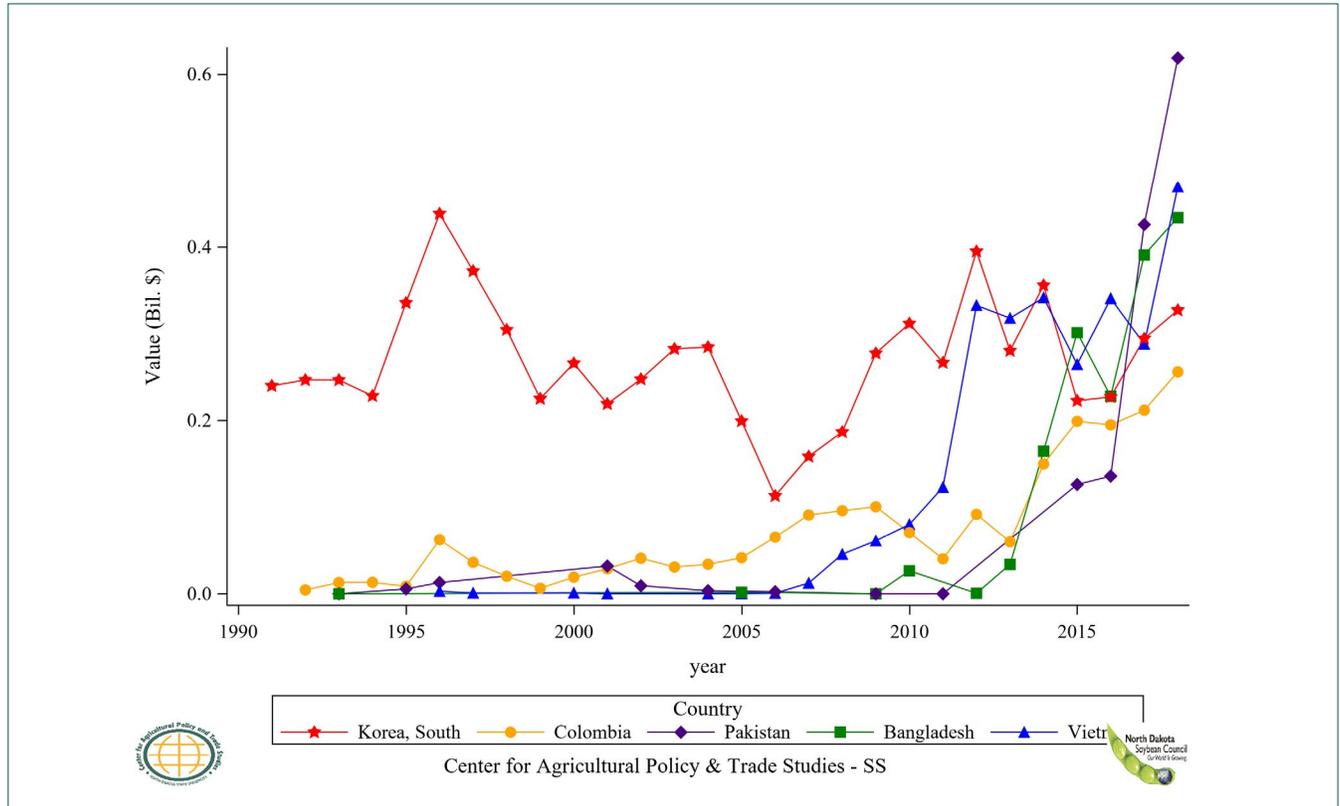
**Figure 48: U.S. Soybean Export Value to Top 5 Countries, Annual Trends**



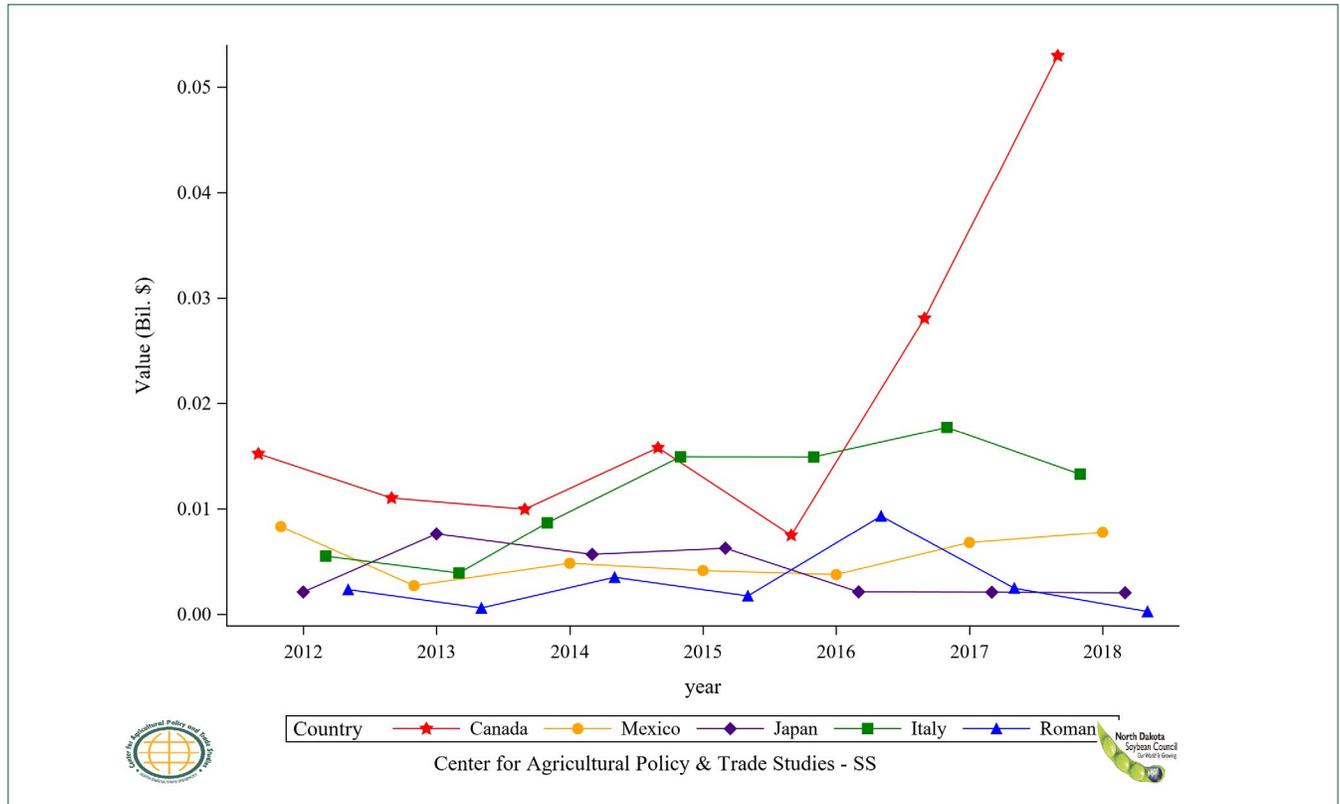
**Figure 49: U.S. Soybean Export Value to Top 6 to 10 Countries, Annual Trends**



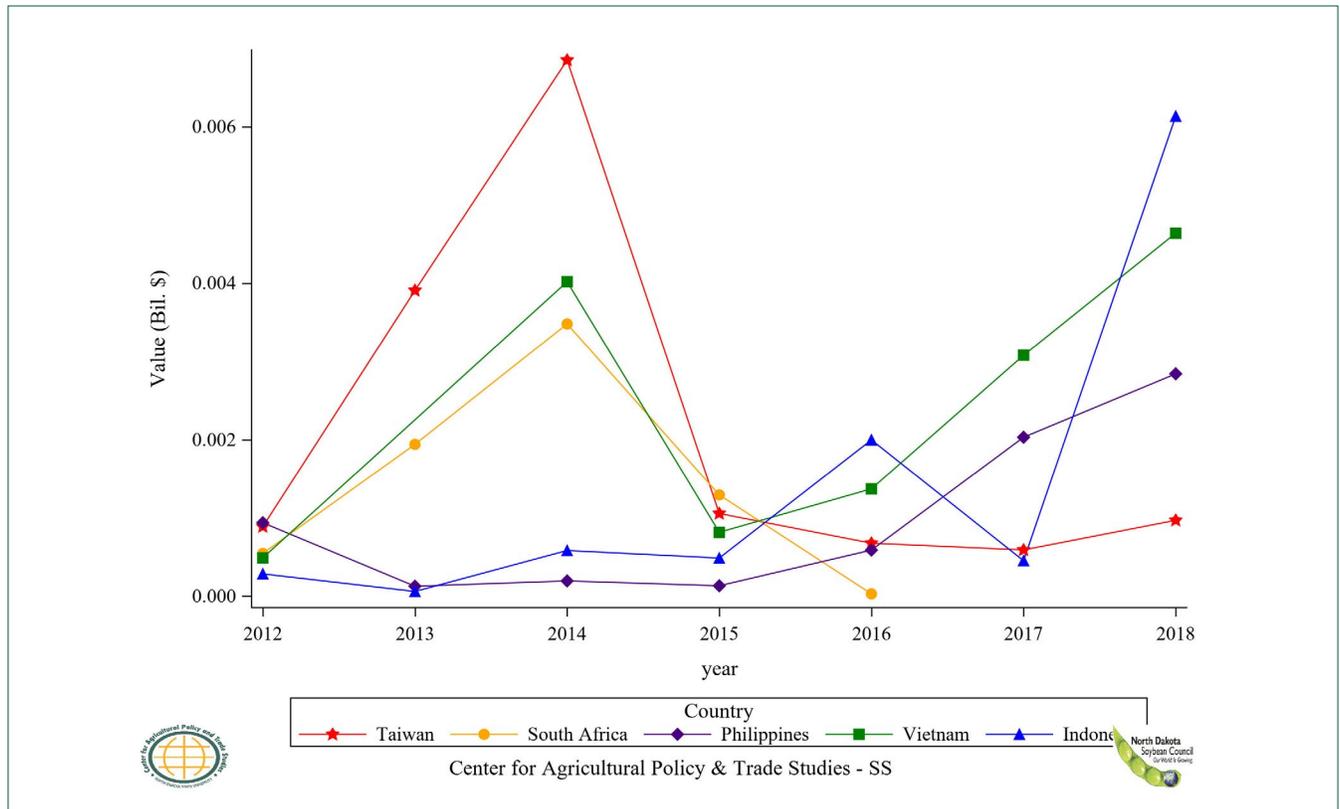
**Figure 50: U.S. Soybean Export Value to Top 11 to 15 Countries, Annual Trends**



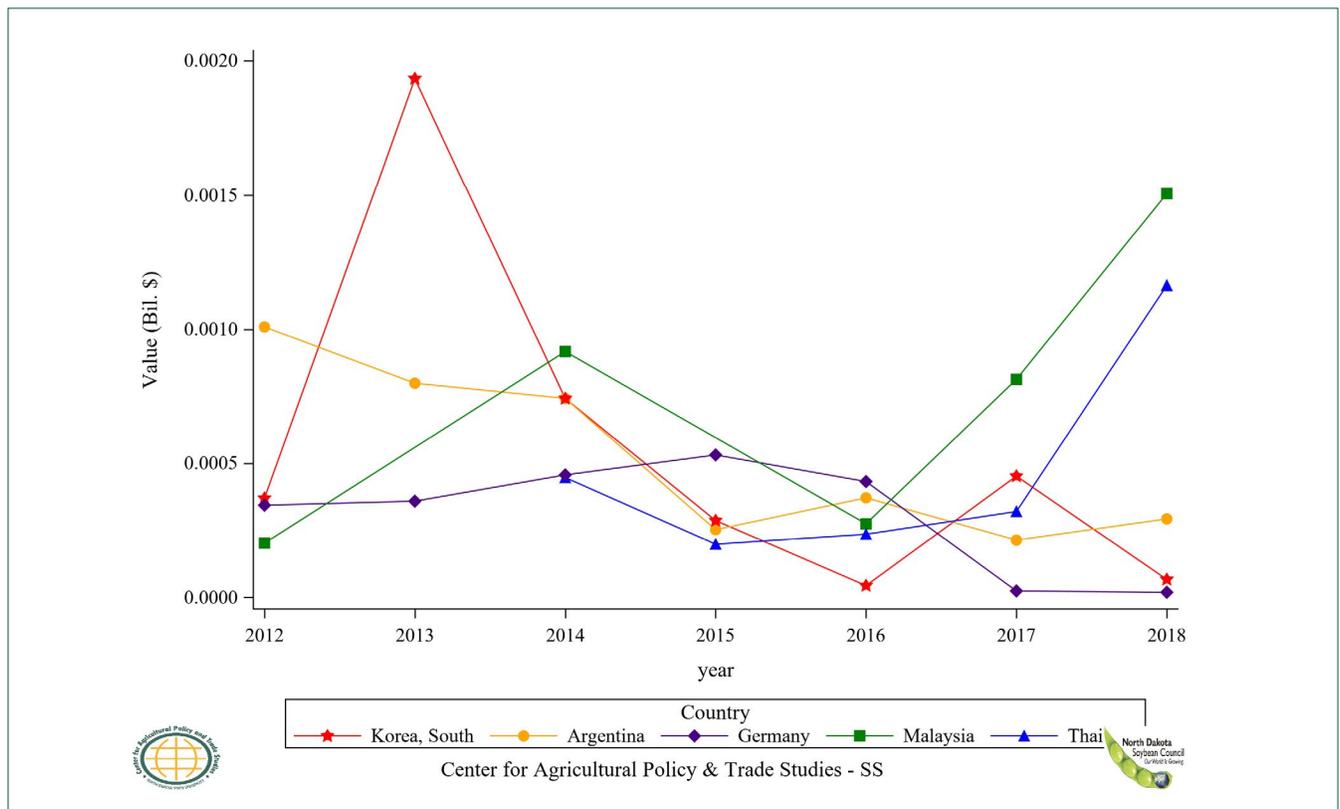
**Figure 51: U.S. Soybean, Seed Export Value to Top 5 Countries, Annual Trends**



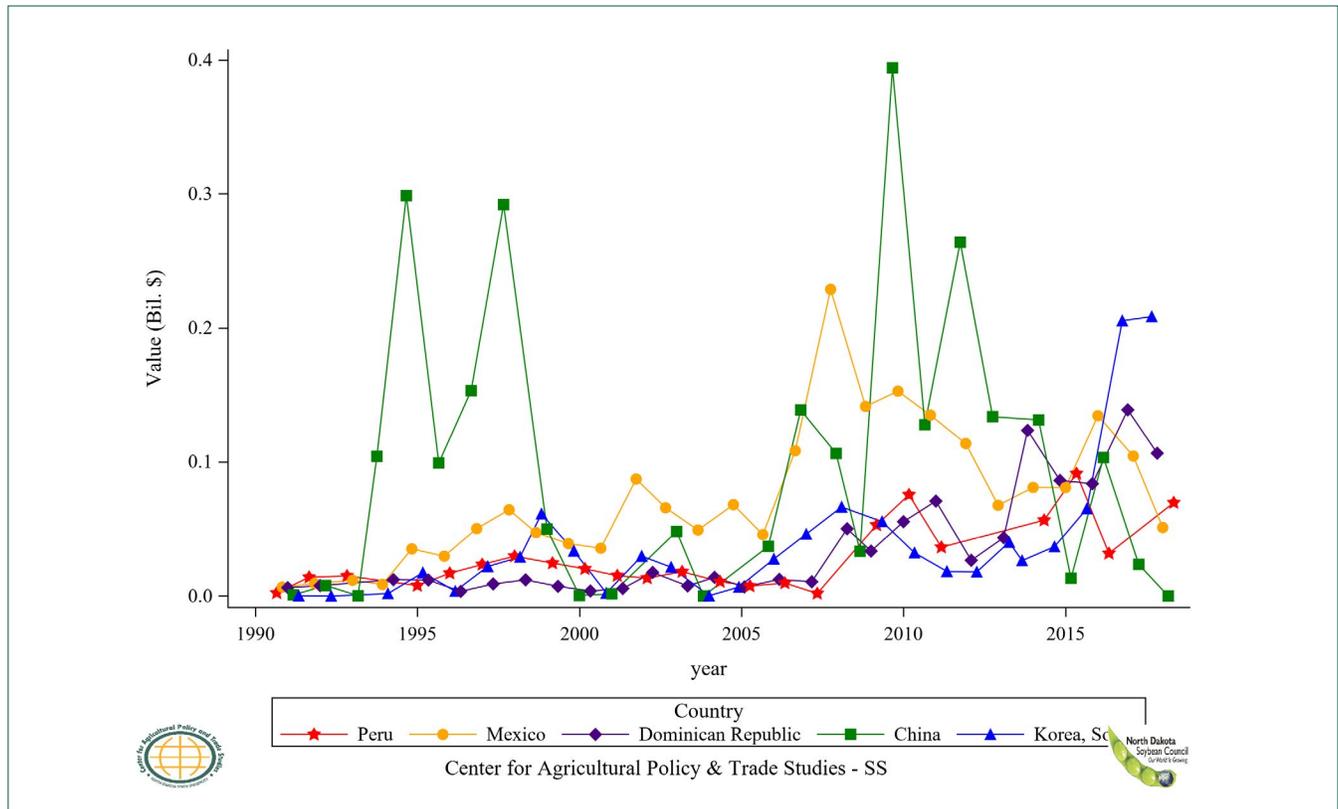
**Figure 52: U.S. Soybean, Seed Export Value to Top 6 to 10 Countries, Annual Trends**



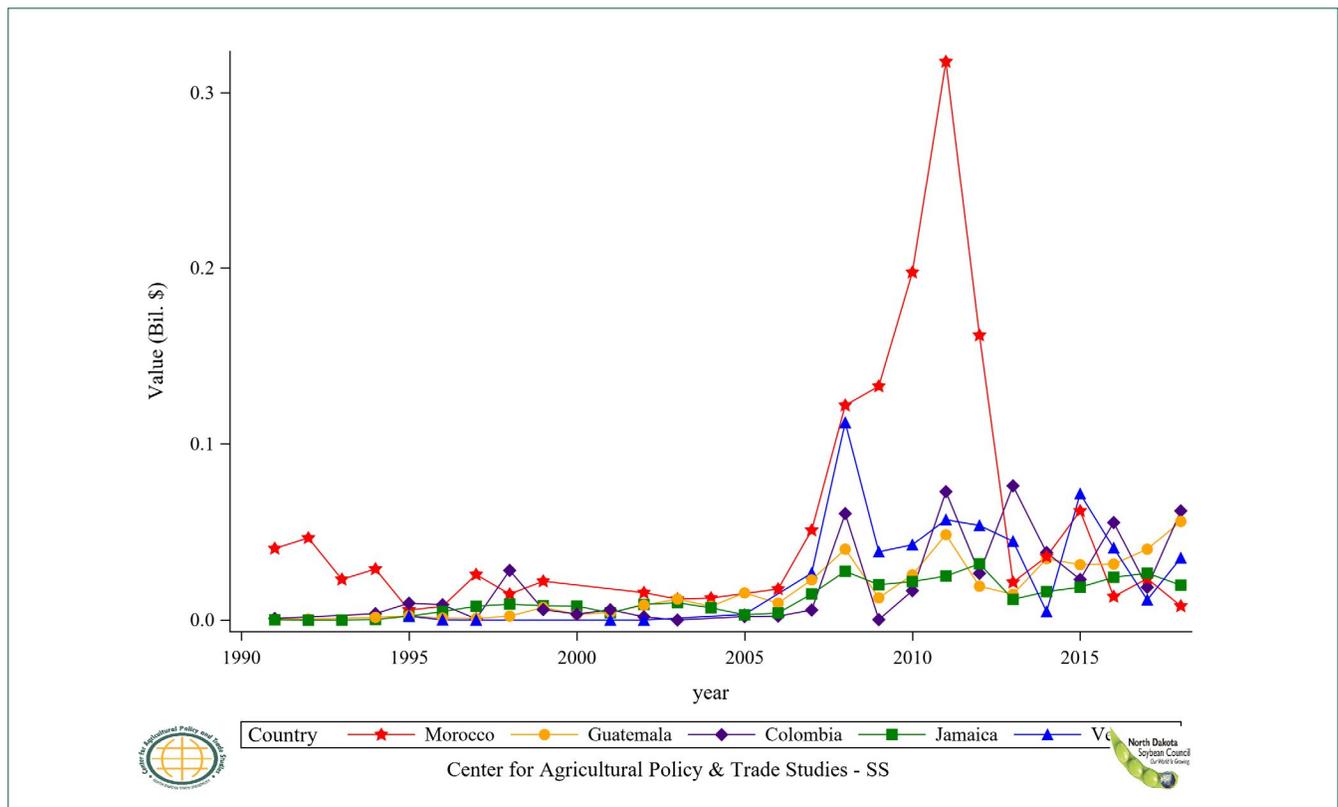
**Figure 53: U.S. Soybean, Seed Export Value to Top 11 to 15 Countries, Annual Trends**



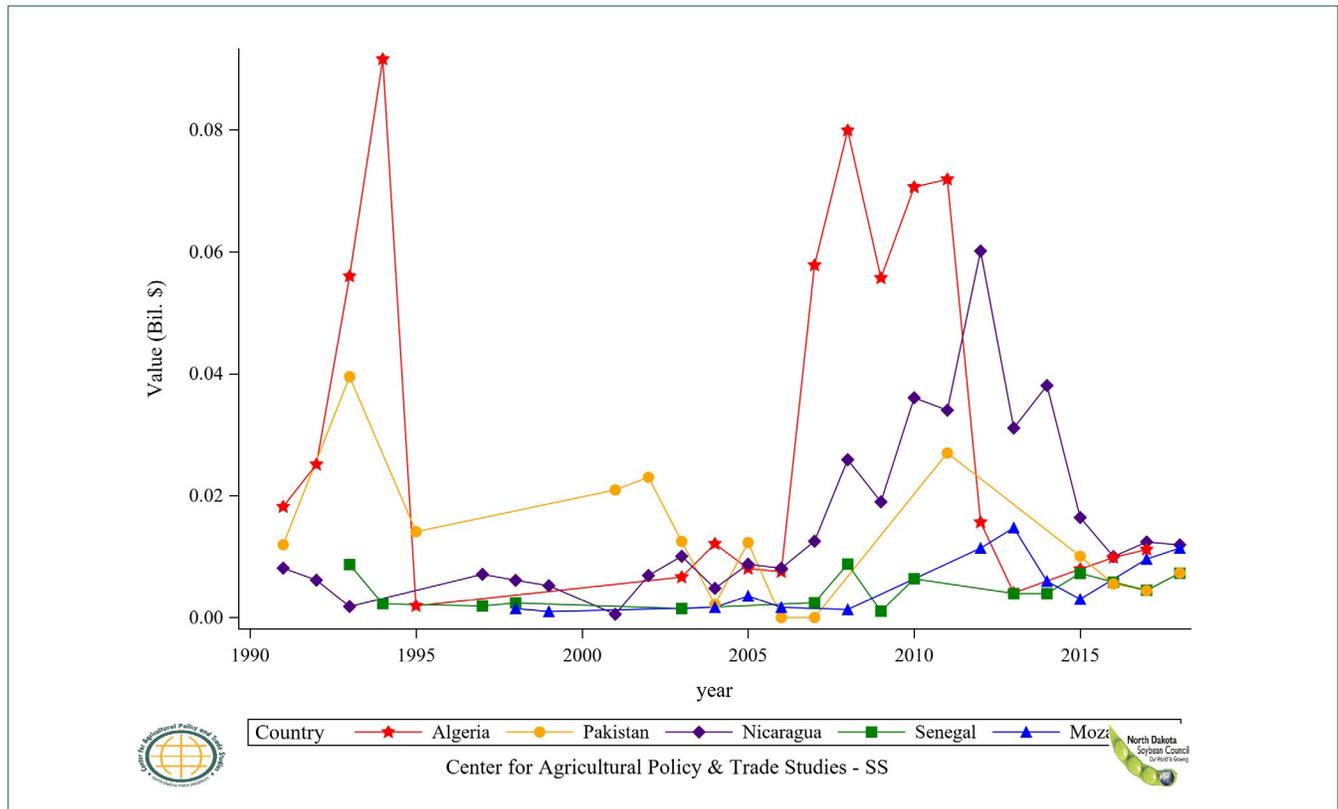
**Figure 54: U.S. Soybean Oil Crude Export Value to Top 5 Countries, Annual Trends**



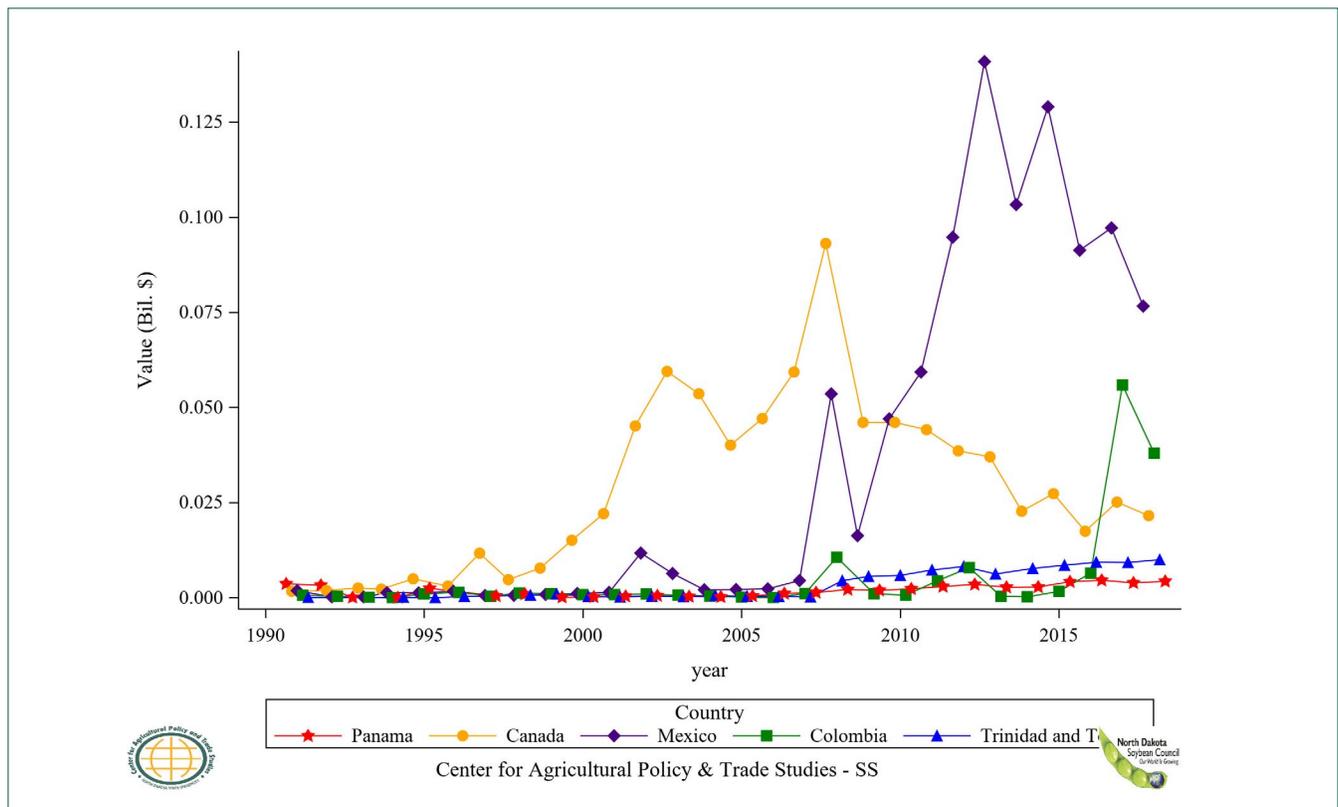
**Figure 55: U.S. Soybean Oil Crude Export Value to Top 6 to 10 Countries, Annual Trends**



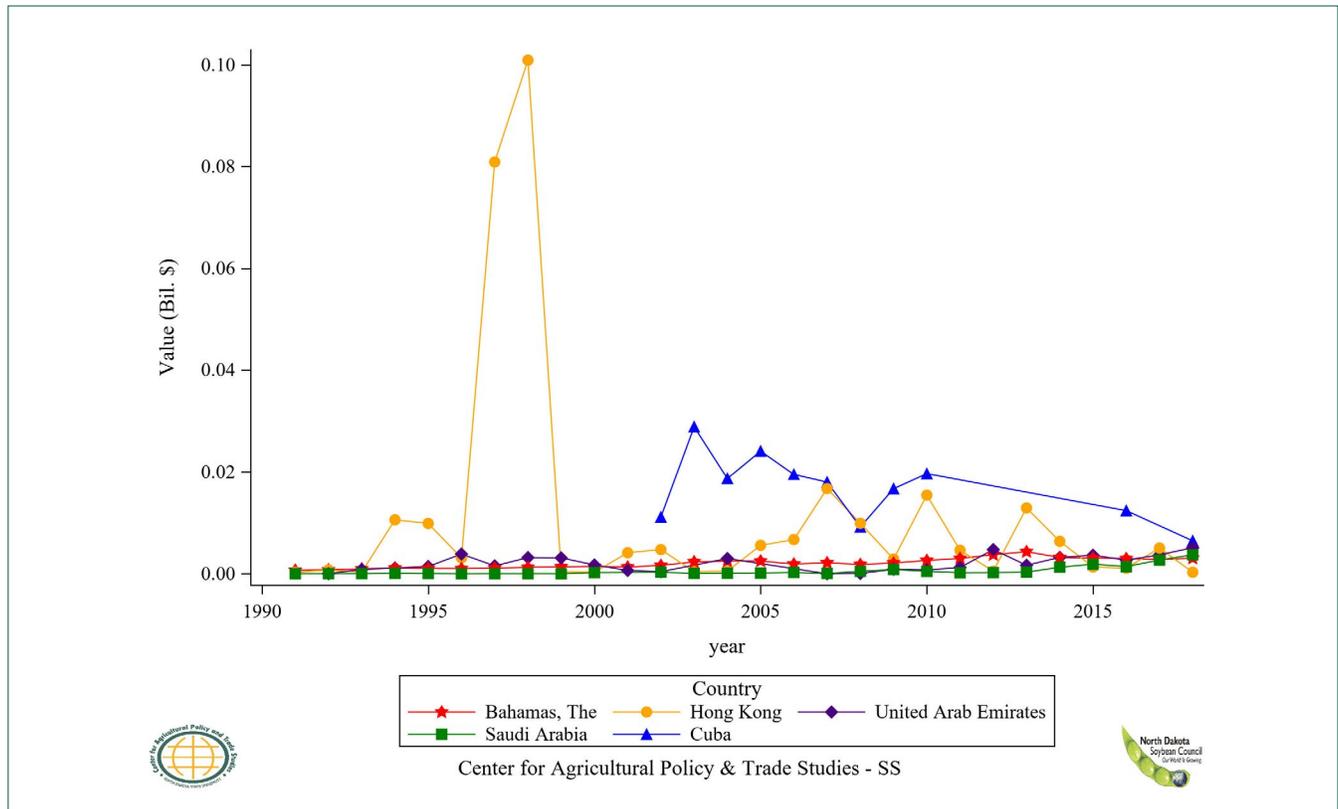
**Figure 56: U.S. Soybean Oil Crude Export Value to Top 11 to 15 Countries, Annual Trends**



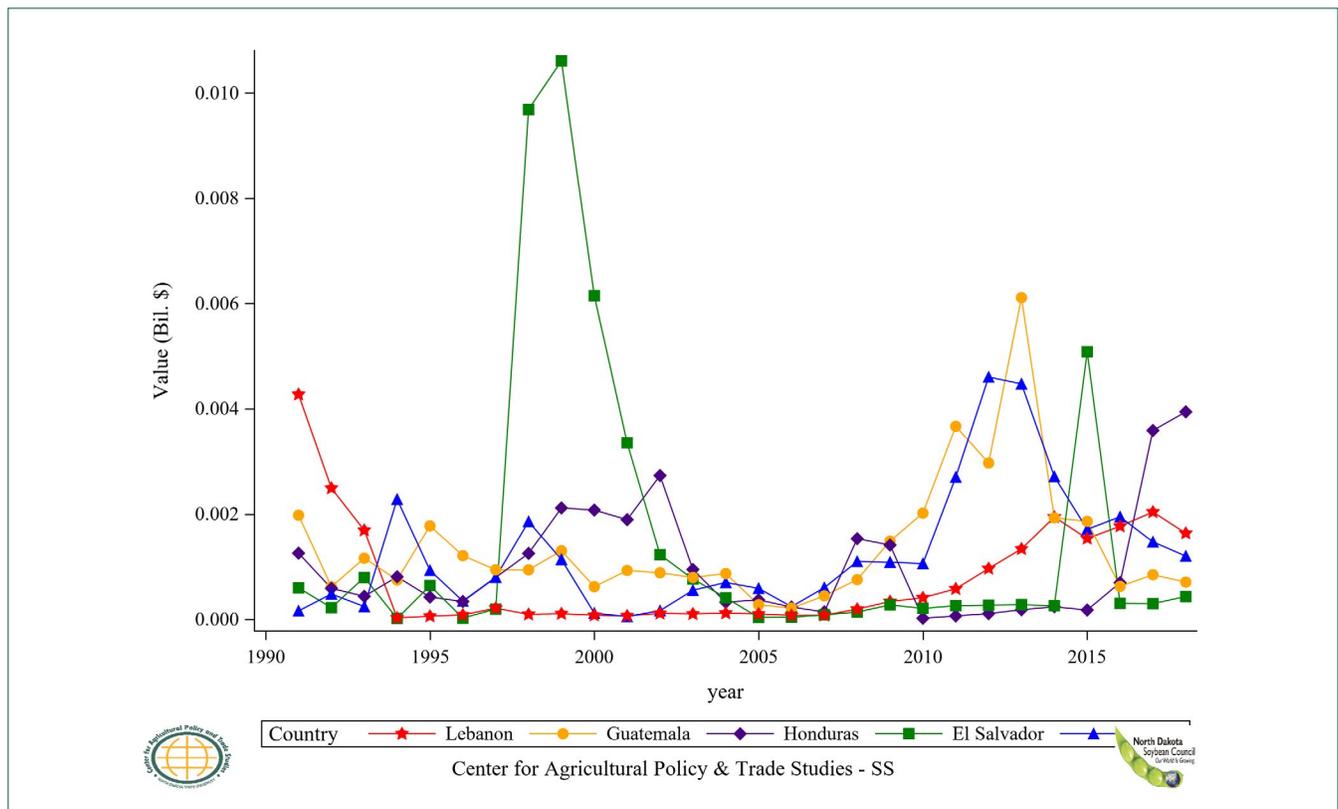
**Figure 57: U.S. Soybean Oil Refined Export Value to Top 5 Countries, Annual Trends**



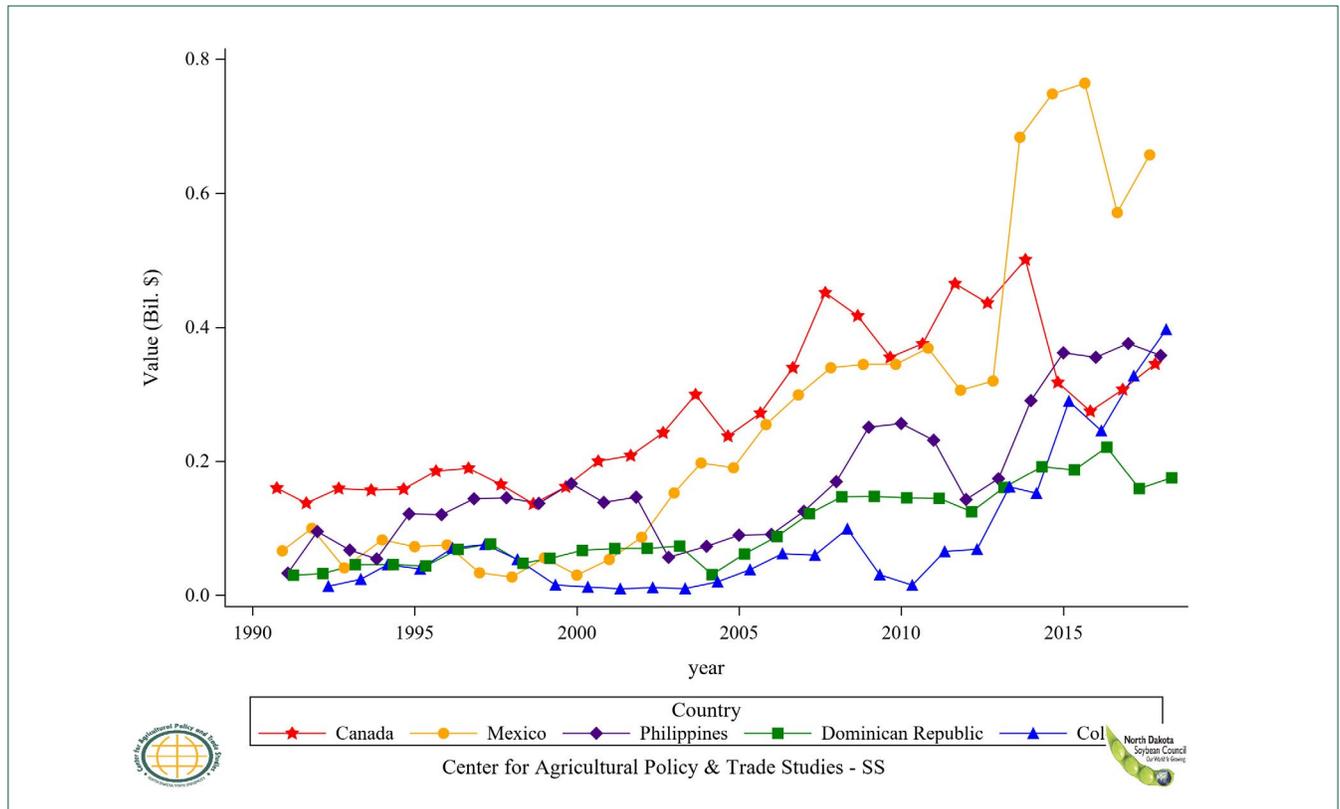
**Figure 58: U.S. Soybean Oil Refined Export Value to Top 6 to 10 Countries, Annual Trends**



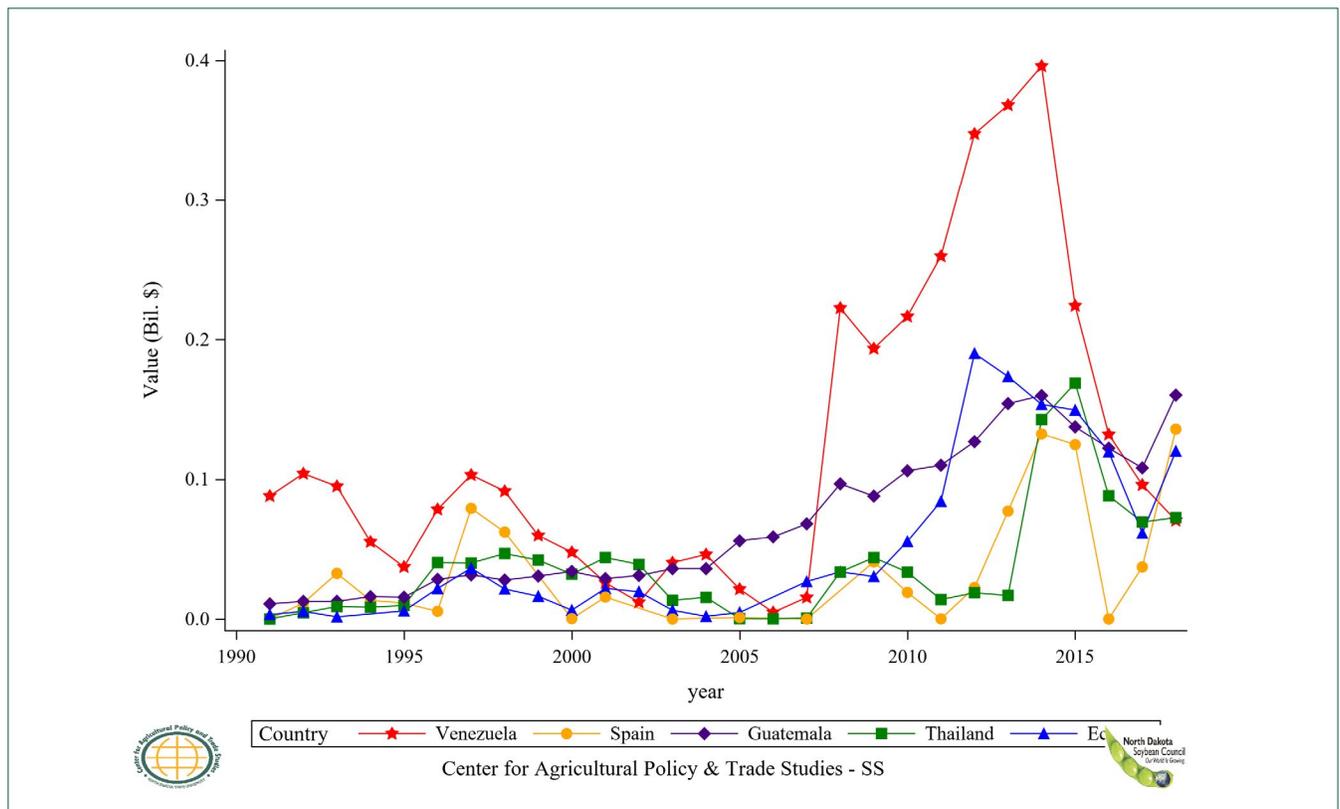
**Figure 59: U.S. Soybean Oil Refined Export Value to Top 11 to 15 Countries, Annual Trends**



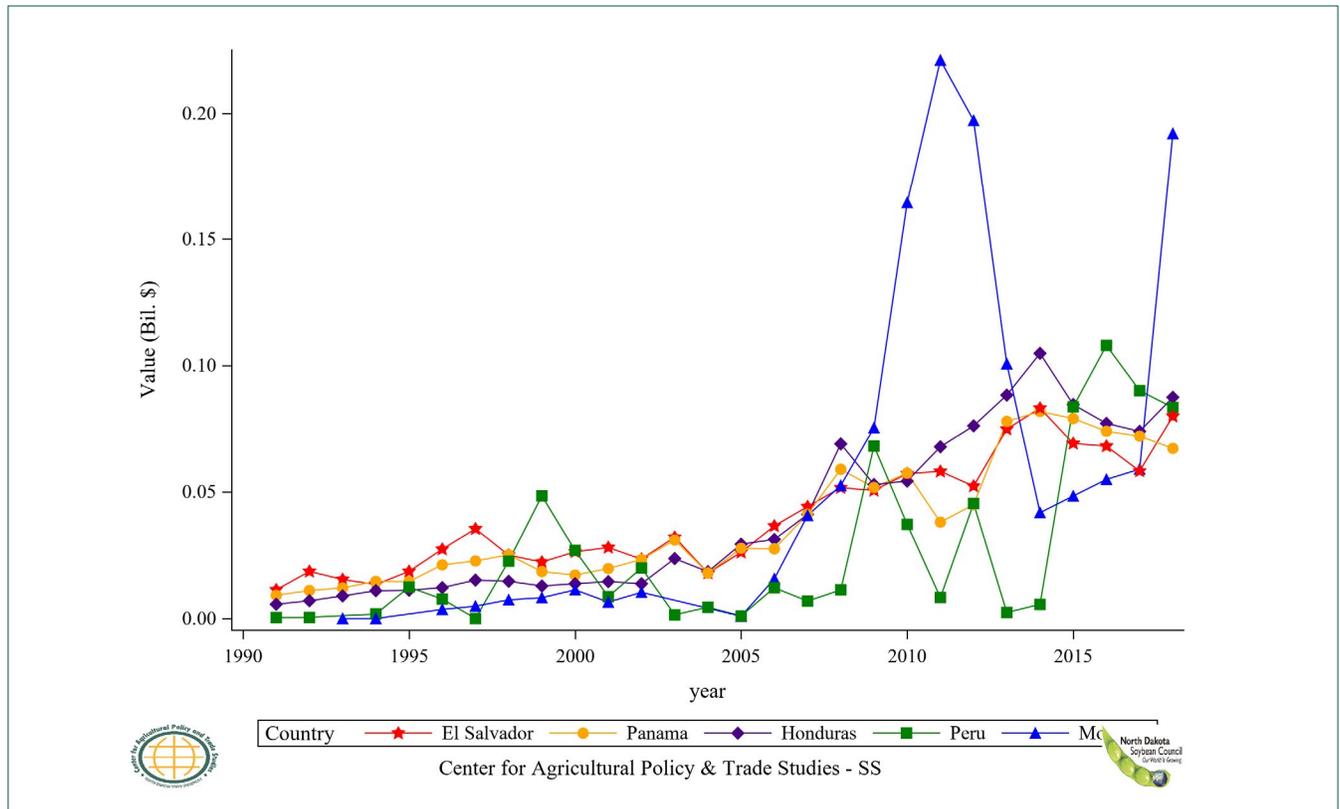
**Figure 60: U.S. Soybean Residue Export Value to Top 5 Countries, Annual Trends**



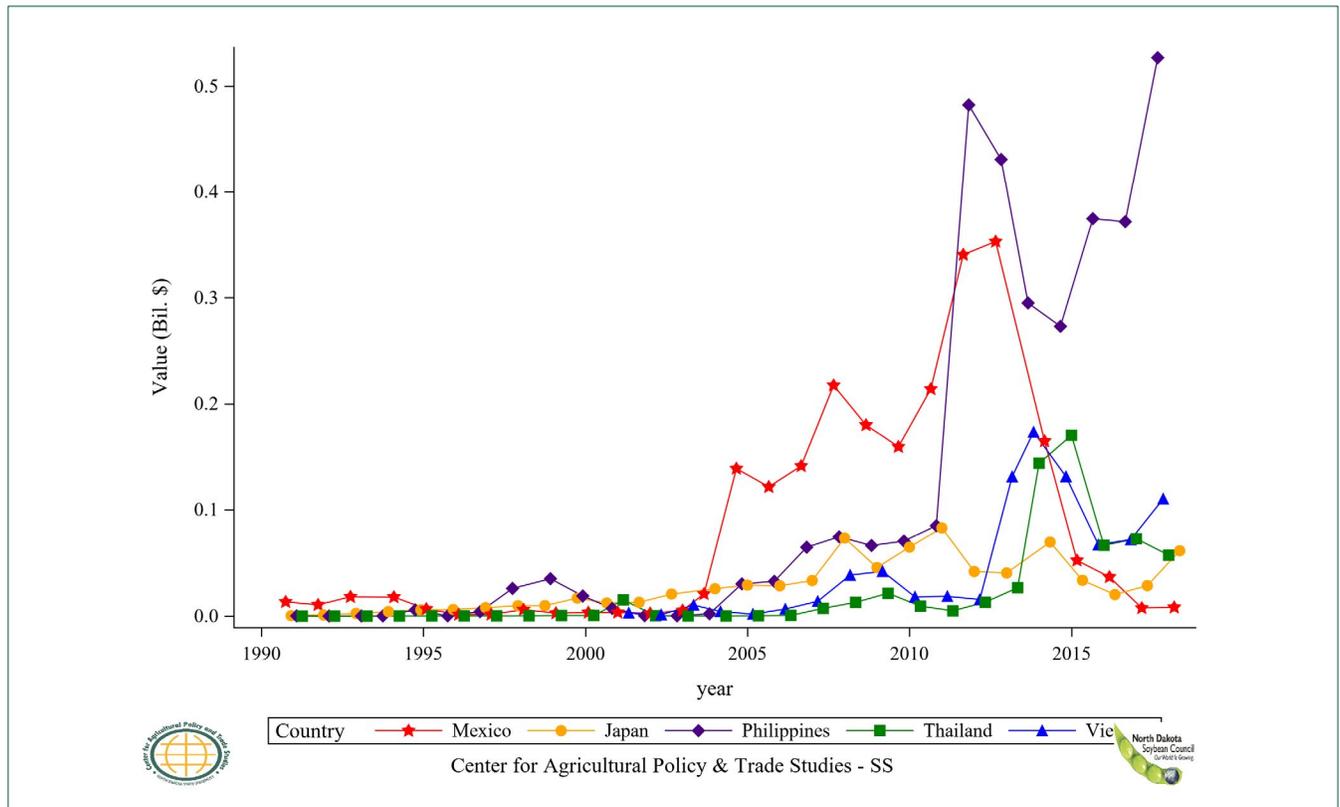
**Figure 61: U.S. Soybean Residue Export Value to Top 6 to 10 Countries, Annual Trends**



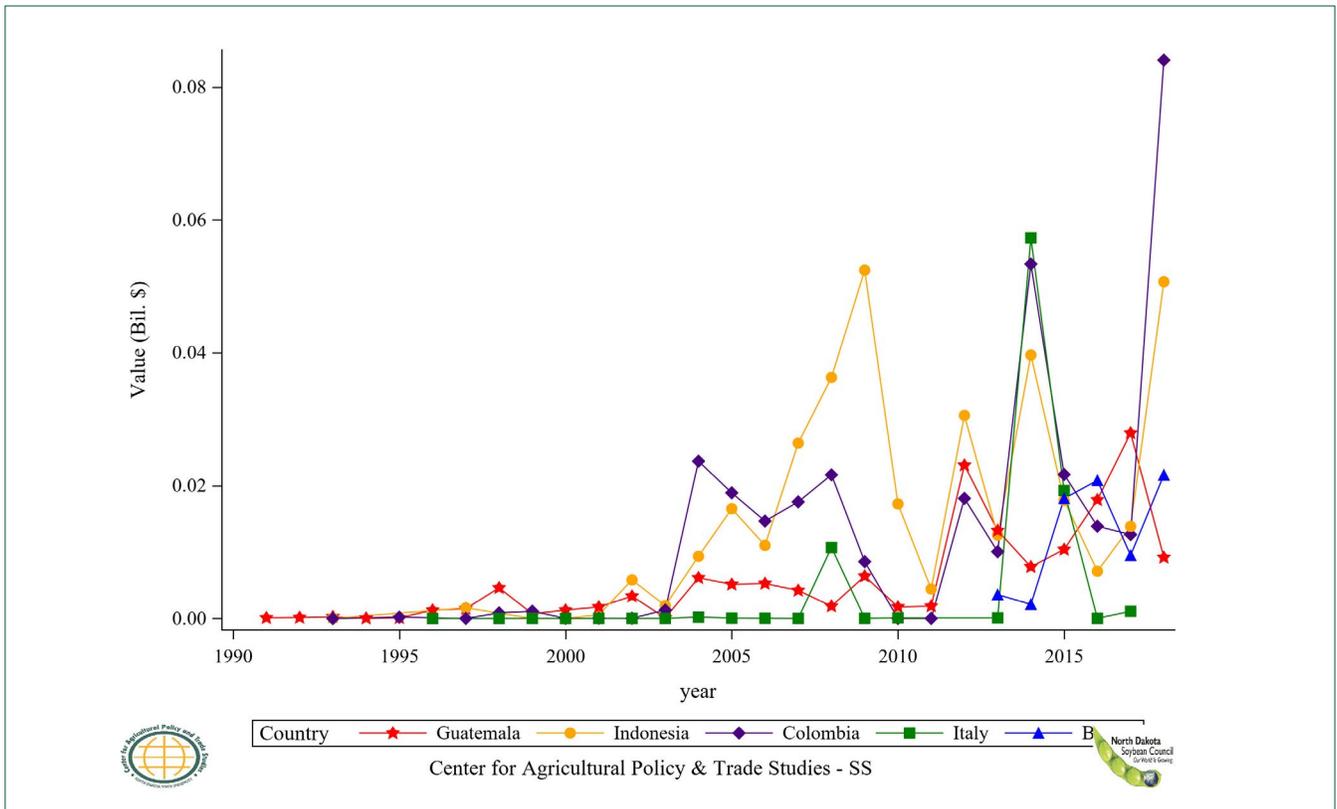
**Figure 62: U.S. Soybean Residue Export Value to Top 11 to 15 Countries, Annual Trends**



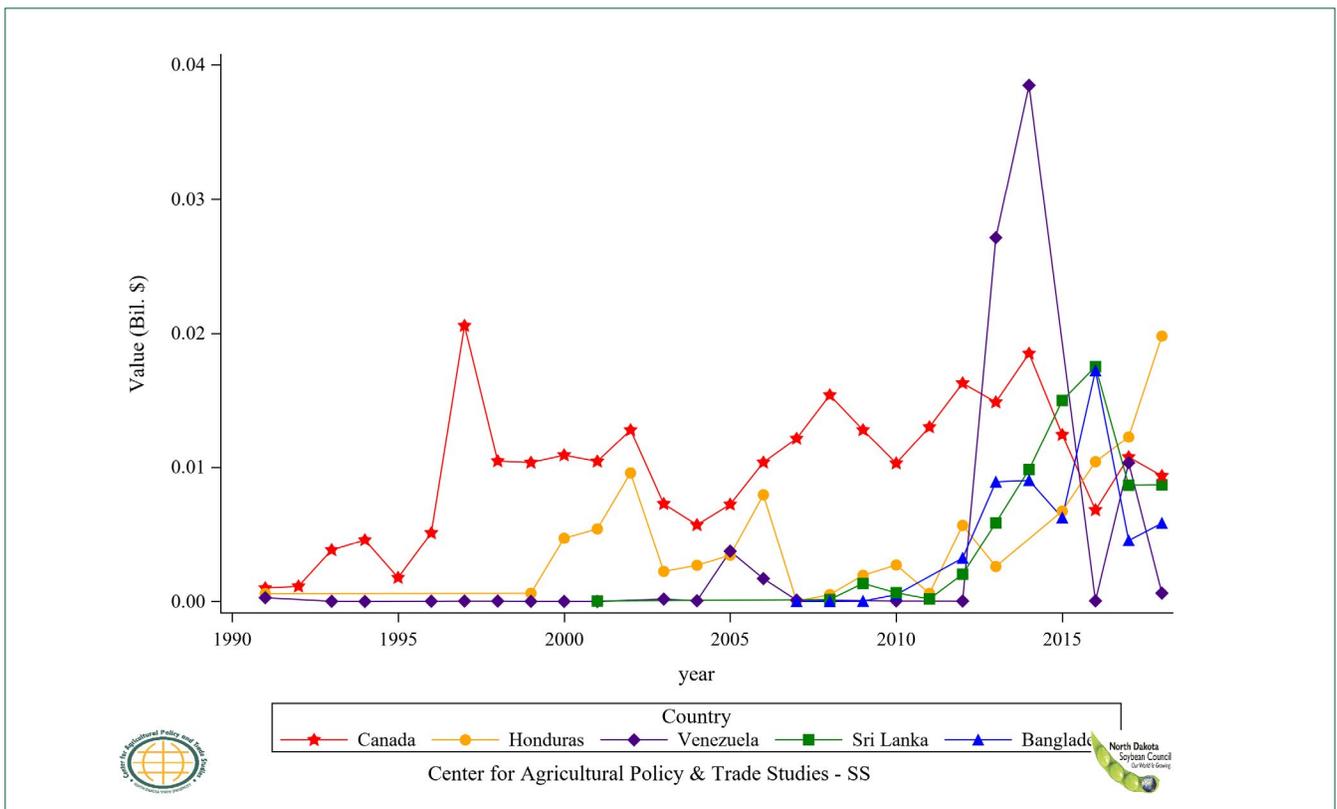
**Figure 63: U.S. Soybean Flour Export Value to Top 5 Countries, Annual Trends**



**Figure 64: U.S. Soybean Flour Export Value to Top 6 to 10 Countries, Annual Trends**



**Figure 65: U.S. Soybean Flour Export Value to Top 11 to 15 Countries, Annual Trends**

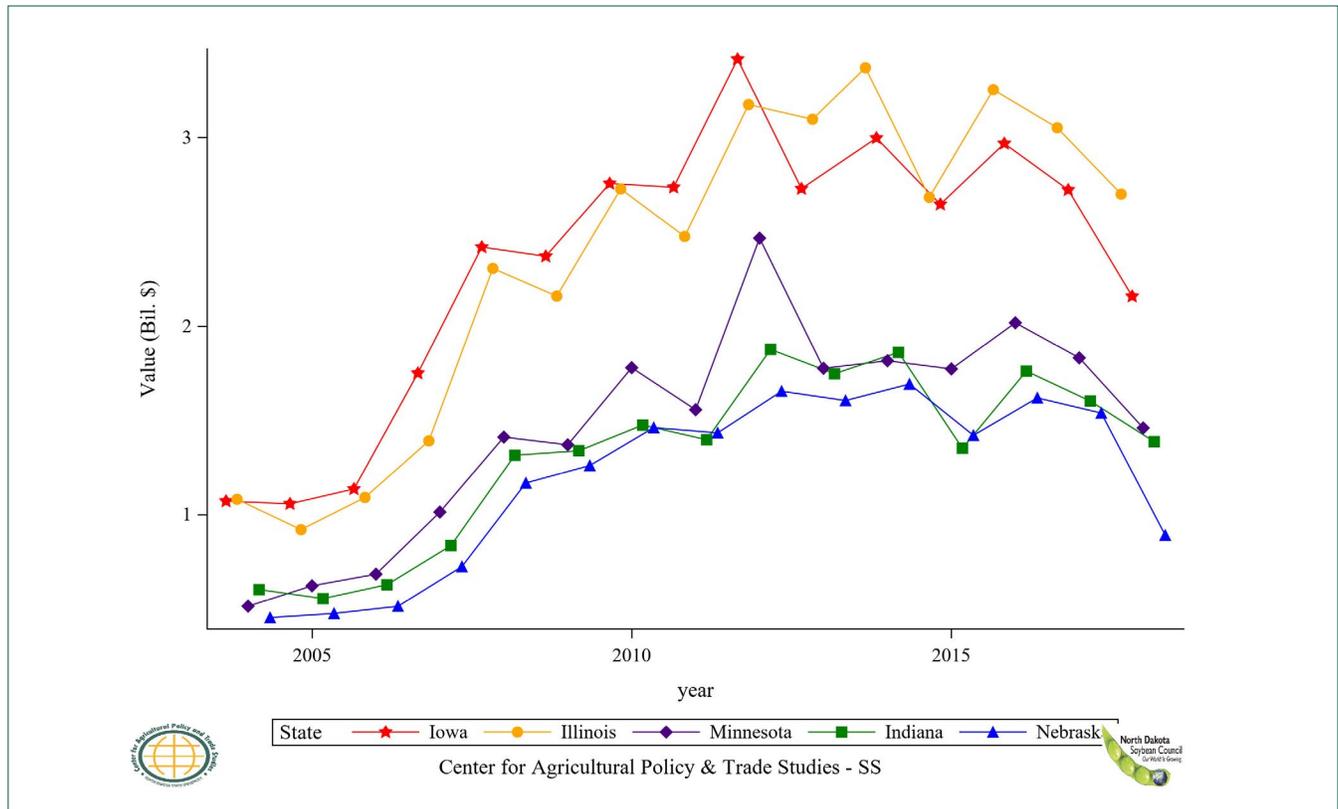


■ Section VI

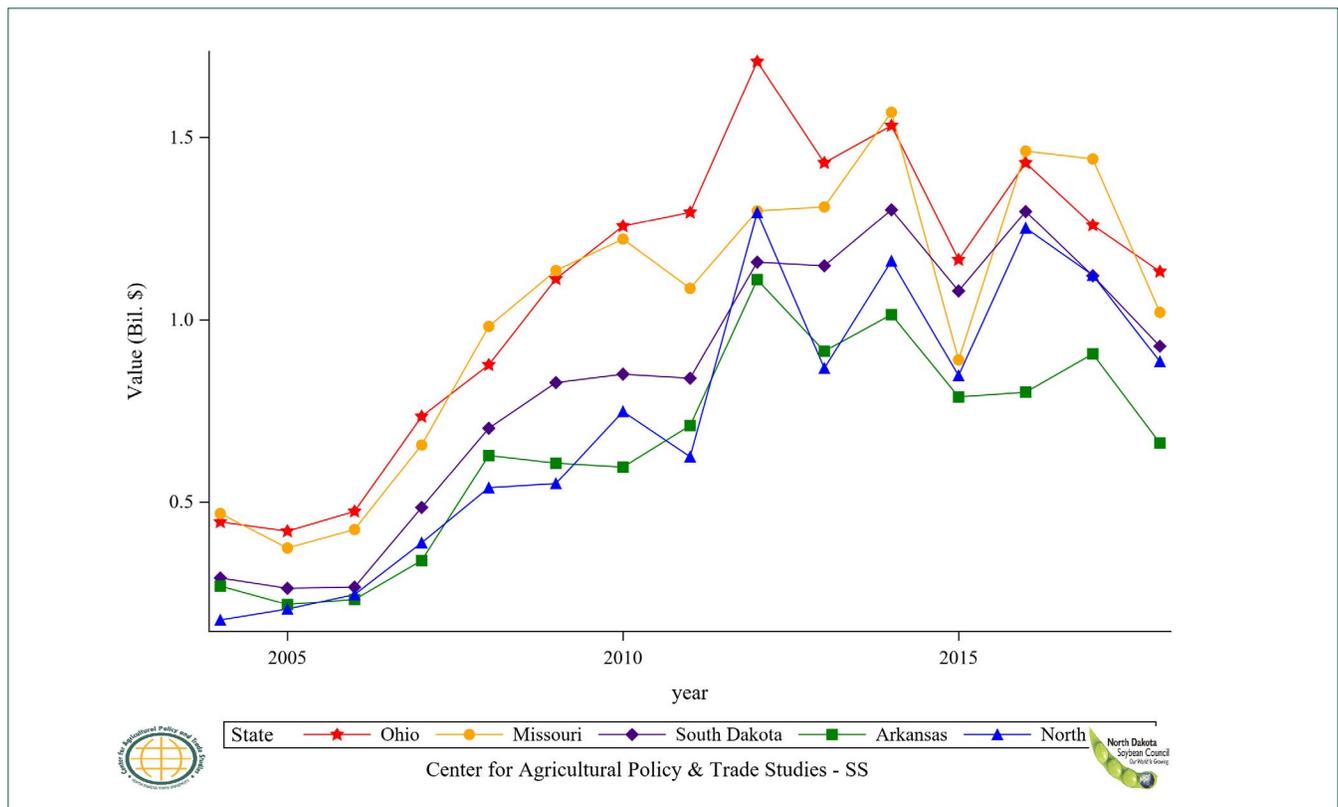
## **U.S. State Level Soybean Export**

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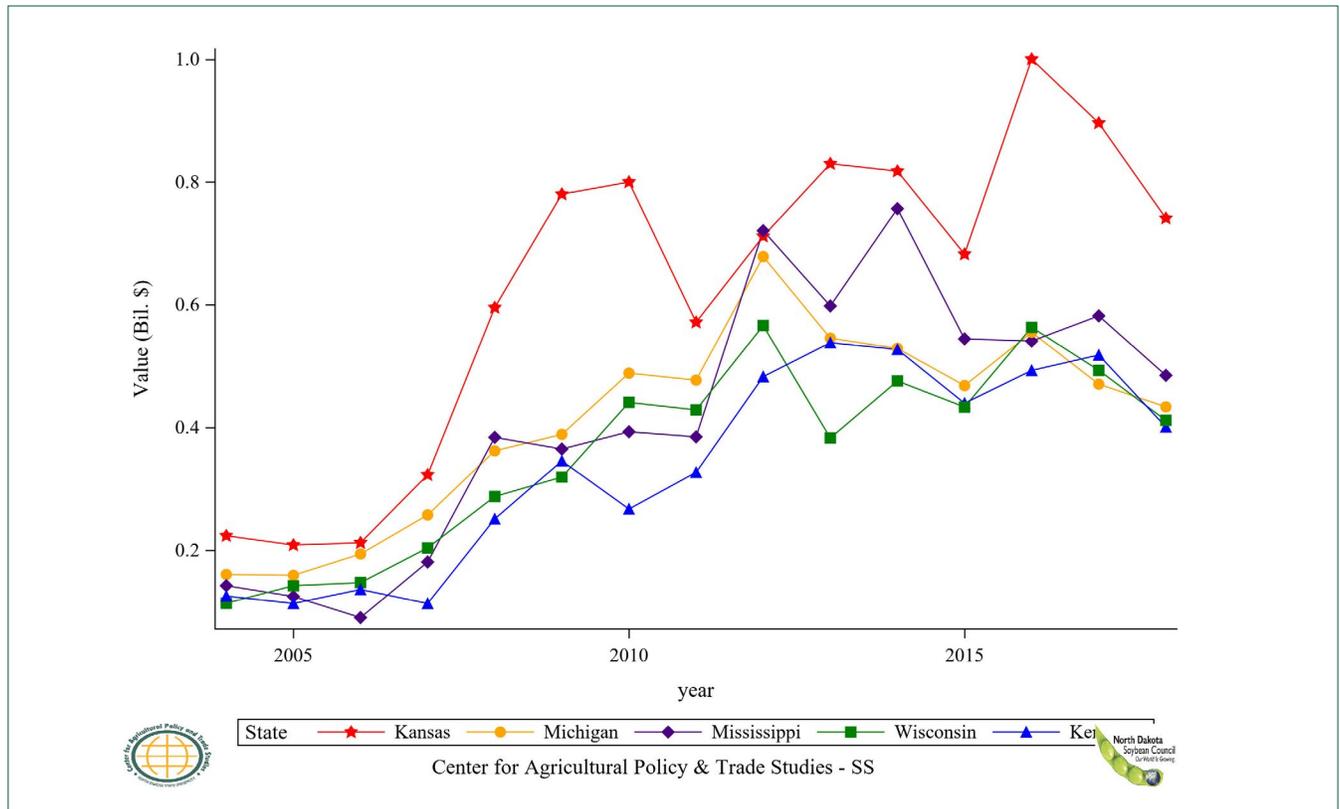
**Figure 66: U.S. Soybean Export Value of Top 5 States, Annual Trends**



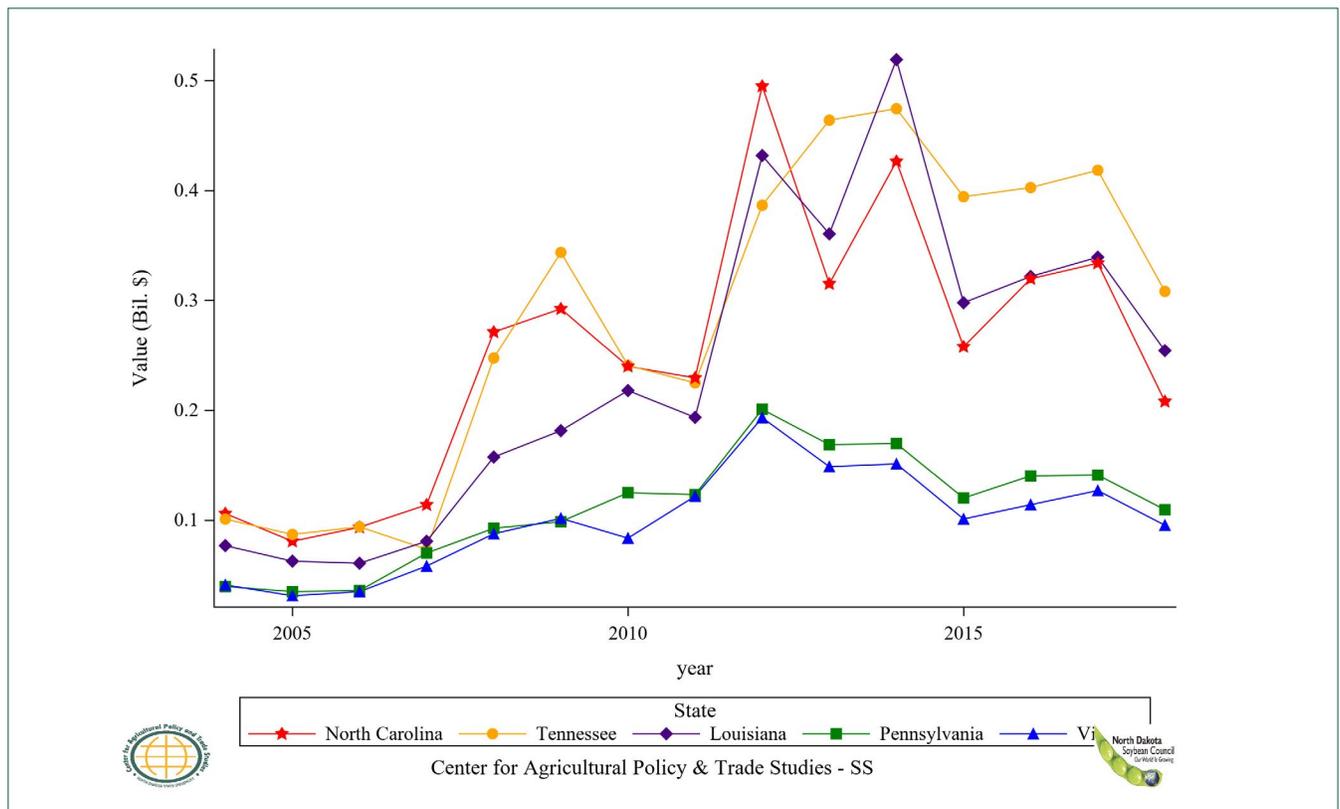
**Figure 67: U.S. Soybean Export Value of Top 6 to 10 States, Annual Trends**



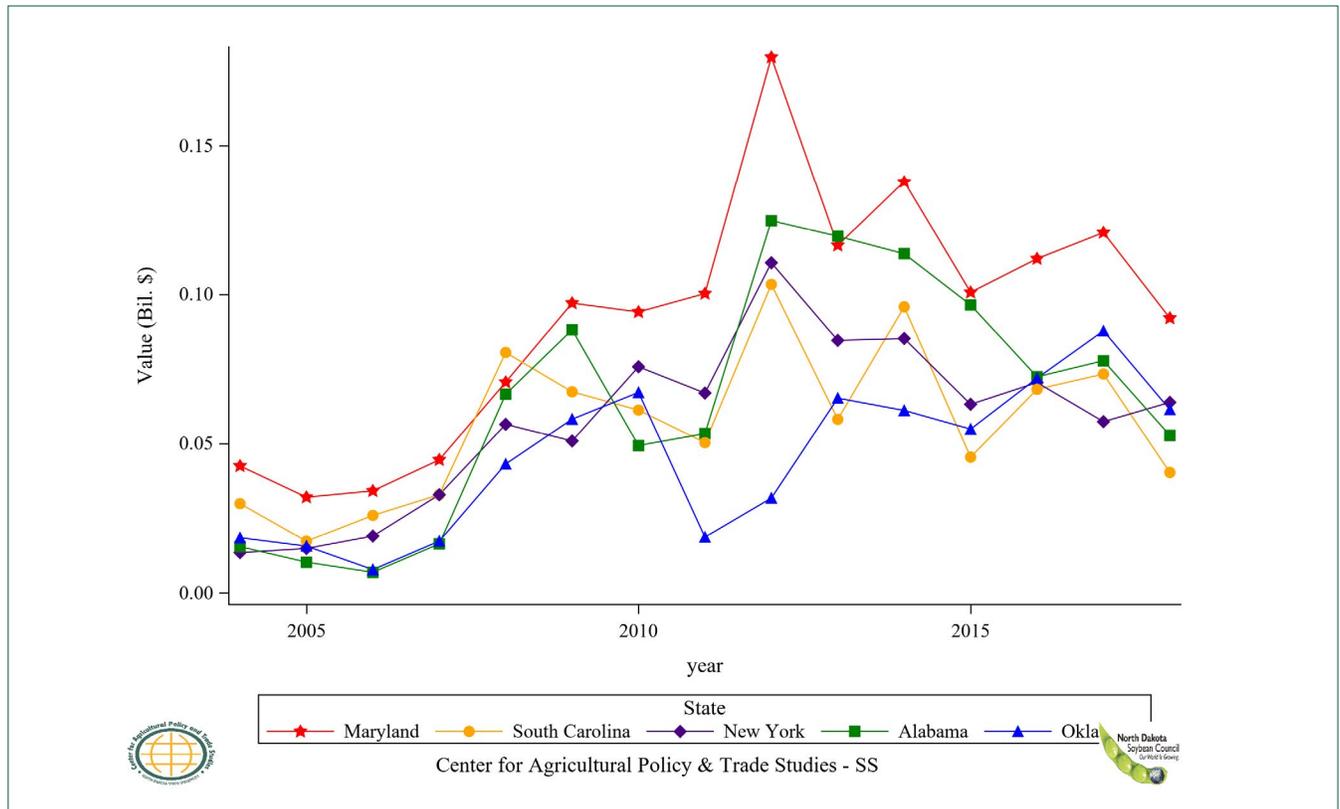
**Figure 68: U.S. Soybean Export Value of Top 11 to 15 States, Annual Trends**



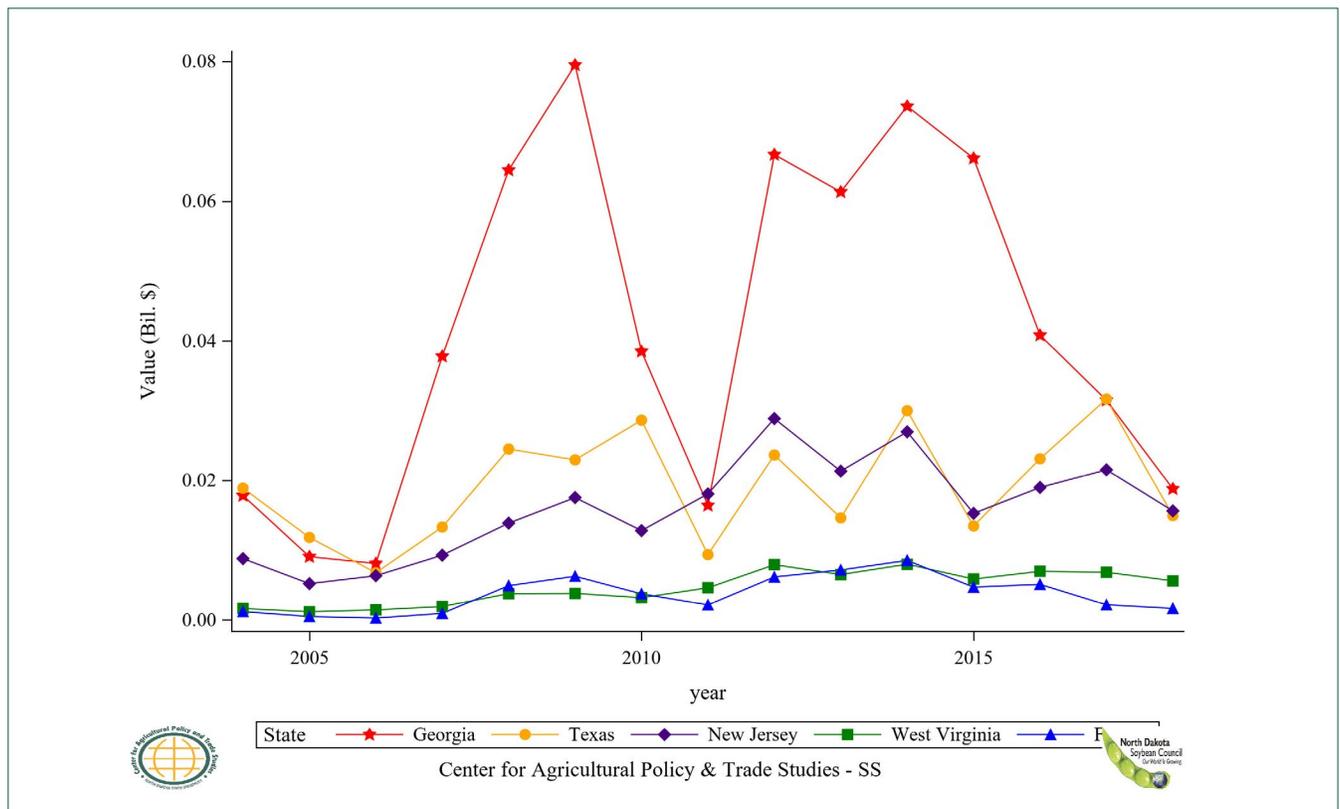
**Figure 69: U.S. Soybean Export Value of Top 16 to 20 States, Annual Trends**



**Figure 70: U.S. Soybean Export Value of Top 21 to 25 States, Annual Trends**



**Figure 71: U.S. Soybean Export Value of Top 26 to 30 States, Annual Trends**



**Table 1: NDSU Estimate of U.S. State Soybean Grain Export Value, Annual Trends.**

Reporter	2010	2011	2012	2013	2014	2015	2016	2017	2018
Alabama	49,392,902	53,381,418	124,668,707	119,458,101	113,582,129	96,466,269	72,386,119	77,762,651	52,786,085
Arkansas	596,148,177	709,761,752	1,109,898,433	914,056,087	1,014,409,247	788,347,767	801,265,558	906,182,168	661,862,886
Florida	3,765,225	2,171,448	6,185,430	7,185,457	8,554,909	4,729,801	5,127,140	2,189,143	1,666,539
Georgia	38,481,192	16,421,572	66,680,298	61,334,317	73,586,720	66,152,300	40,815,062	31,491,863	18,800,466
Illinois	2,728,267,437	2,475,450,182	3,175,558,000	3,097,558,770	3,371,591,259	2,683,744,235	3,254,794,085	3,052,350,584	2,700,661,679
Indiana	1,474,741,783	1,396,830,689	1,875,803,109	1,746,689,864	1,860,562,277	1,351,448,409	1,760,623,814	1,601,719,182	1,386,513,407
Iowa	2,757,085,048	2,736,858,741	3,417,212,339	2,729,554,351	2,998,307,820	2,646,814,660	2,969,181,259	2,723,238,639	2,158,279,331
Kansas	800,110,250	571,713,986	711,663,210	830,007,923	817,903,101	682,485,202	1,000,375,934	896,143,182	741,156,947
Kentucky	267,268,449	327,055,092	482,939,366	538,290,444	527,318,931	439,661,201	493,030,458	518,241,349	400,970,328
Louisiana	217,832,388	193,456,234	431,714,713	360,356,070	519,043,748	297,803,111	321,665,569	339,166,519	254,198,597
Maryland	94,115,735	100,271,342	179,567,233	116,393,117	137,820,435	100,683,175	111,921,500	120,682,953	92,058,190
Michigan	488,642,826	477,331,416	678,573,424	545,655,117	529,045,017	468,368,347	555,271,743	470,720,365	433,760,729
Minnesota	1,778,711,499	1,555,721,518	2,466,440,332	1,775,678,238	1,815,490,713	1,772,133,000	2,017,685,179	1,831,024,795	1,459,259,490
Mississippi	393,285,906	384,938,425	720,713,084	598,207,869	756,819,477	544,529,091	540,935,397	582,072,569	485,039,235
Missouri	1,221,212,188	1,086,209,507	1,298,515,539	1,309,796,844	1,568,853,765	889,670,988	1,462,660,953	1,441,065,787	1,020,369,381
Nebraska	1,461,070,892	1,433,155,369	1,653,922,321	1,604,512,966	1,691,944,169	1,420,129,242	1,618,625,340	1,538,223,634	890,089,246
New Jersey	12,815,654	18,069,350	28,863,642	21,338,540	26,969,714	15,277,966	18,989,780	21,528,741	15,632,374
New York	75,735,585	66,946,111	110,560,035	84,559,572	85,192,034	63,189,736	70,471,088	57,379,144	63,843,819
North Carolina	239,902,855	229,349,092	494,913,724	315,029,866	426,440,479	257,802,599	319,572,057	333,697,558	207,935,000
North Dakota	748,253,829	624,472,118	1,294,063,389	866,901,586	1,161,115,671	846,756,197	1,251,508,675	1,122,286,931	885,365,842
Ohio	1,256,900,466	1,294,533,668	1,708,147,360	1,430,415,391	1,532,221,716	1,164,702,811	1,430,163,251	1,259,449,514	1,132,158,630
Oklahoma	67,156,429	18,733,304	31,810,784	65,256,268	61,127,727	54,884,149	71,910,167	87,761,107	61,430,211
Pennsylvania	124,792,643	123,149,223	200,761,395	168,717,642	169,718,888	120,005,292	140,179,420	140,937,595	109,397,886
South Carolina	61,259,065	50,338,102	103,322,742	58,173,785	95,831,901	45,502,340	68,211,443	73,310,579	40,359,805
South Dakota	850,666,949	839,515,795	1,157,917,084	1,147,883,455	1,301,743,034	1,079,088,366	1,297,029,929	1,120,602,335	927,471,897
Tennessee	240,687,153	224,777,720	386,535,016	463,868,931	474,287,556	394,342,345	402,629,473	418,343,046	308,128,457
Texas	28,633,567	9,376,705	23,651,907	14,634,292	29,991,120	13,474,783	23,109,452	31,655,542	14,959,919
Virginia	83,579,059	121,641,274	193,175,746	148,669,751	151,204,397	100,986,835	113,958,886	126,798,837	95,318,044
West Virginia	3,214,579	4,629,405	7,937,969	6,533,449	8,011,165	5,891,864	6,995,585	6,857,895	5,637,313
Wisconsin	441,013,478	428,764,012	566,204,774	383,065,956	475,836,623	433,542,933	563,429,704	493,329,387	411,719,410

**Table 2: FAS Estimate of U.S. State Soybean Grain Export Value, Annual Trends.**

Reporter	2010	2011	2012	2013	2014	2015	2016	2017	2018
Alabama	428,913,454	210,782,592	59,364,625	29,503,499	221,409,827	264,969,749	287,981,379	209,525,965	154,048,982
Alaska	.	.	.	.	.	.	.	.	60,000
Arizona	.	5,944	.	.	304,842	221,509	.	.	.
Arkansas	38,577,159	58,469,109	36,998,625	45,311,903	26,953,714	8,637,979	7,101,822	22,123,753	15,149,539
California	17,730,485	6,354,428	1,249,508	2,772,092	9,757,607	16,410,061	36,936,831	22,134,534	4,262,074
Colorado	.	.	10,777	.	.	.	553,055	4,836,963	.
Connecticut	244,936,851	132,411,400	14,435,138	2,508	.	.	.	7,323	5,400
District of Columbia	58,193,233	.	.	.	369,651	.	.	.	.
Florida	287,302	17,291	101,050	260,338	143,577	388,841	317,075	359,325	620,082
Georgia	39,443,574	16,296,170	15,122,056	22,077,697	49,213,718	15,762,389	15,198,326	16,054,456	4,089,106
Idaho	226,711	541,449	158,434	92,755	170,847	29,683	.	261,338	717,598
Illinois	814,243,258	1,625,854,587	1,362,897,365	2,214,293,471	1,817,716,871	1,545,176,493	2,332,596,018	2,066,582,523	1,085,258,241
Indiana	14,686,144	28,699,888	6,213,448	7,537,154	14,734,668	17,513,467	13,326,299	49,528,290	19,149,433
Iowa	540,983,969	320,972,852	407,828,629	233,301,810	514,585,104	384,733,628	254,397,650	181,208,717	446,017,735
Kansas	129,478,630	109,464,637	610,325,254	850,842,098	395,292,804	167,803,856	241,910,523	403,491,950	489,182,199
Kentucky	2,080,386	5,007,883	1,972,876	1,177,347	6,195,332	1,019,129	2,623,310	957,863	8,283,346
Louisiana	8,764,338,491	8,291,470,163	12,843,402,733	9,511,056,196	10,670,343,934	8,989,056,848	10,929,406,459	10,612,210,335	8,586,069,559
Maine	110,354	165,257	554,568	665,455	866,142	262,116	462,777	209,331	176,307
Maryland	4,843,312	2,869,428	469,815	5,811,169	37,242,724	16,142,674	13,152,113	21,694,528	11,704,377
Massachusetts	.	.	70,029	.	33,603	13,264	39,032	20,739	.
Michigan	78,735,580	113,914,680	141,246,383	124,641,629	155,154,577	109,425,060	112,277,996	146,249,414	178,533,566
Minnesota	262,182,677	209,823,377	115,791,483	141,262,415	227,452,759	174,401,674	188,308,175	162,289,202	160,168,898
Mississippi	69,377,998	76,123,598	9,324,240	27,928,050	43,824,384	.	7,997,369	109,695,163	24,833,770
Missouri	175,253,679	120,381,361	155,468,801	138,178,418	161,337,031	164,373,988	215,189,400	190,678,016	150,160,873
Montana	174,848	.	.	.	.	.	7,046	.	168,027
Nebraska	359,487,907	560,407,597	639,226,332	422,040,296	518,221,910	314,912,665	337,945,415	335,468,101	505,992,006
Nevada	8,223	.	.	6,276,392	.	.	.	.	.
New Hampshire	.	.	.	.	59,000	.	.	9,511	.
New Jersey	74,843,698	77,469,875	90,107,061	76,090,588	73,649,989	60,990,057	92,267,379	79,923,599	101,438,203
New York	51,339,692	62,575,399	153,853,141	117,226,800	178,929,758	142,133,404	120,591,915	106,098,708	80,713,587
North Carolina	78,469,848	33,453,452	60,915,957	87,611,219	70,583,803	41,636,904	23,954,134	43,863,346	38,068,885
North Dakota	31,812,886	53,376,277	19,991,108	48,847,042	108,537,241	45,280,399	24,666,687	53,903,787	62,543,314
Ohio	341,798,999	530,788,095	884,125,989	1,216,348,179	1,728,523,660	1,702,615,896	2,078,849,724	1,755,642,873	1,520,681,385
Oklahoma	11,092,775	62,186,818	504,738	.	.	84,010	13,358,244	.	11,702,737
Oregon	388,110,204	182,637,110	402,945,102	381,553,051	278,127,532	35,292,036	166,150,223	54,831,859	100,464,378
Pennsylvania	11,151,344	11,133,835	3,824,207	.	69,929	.	92,349	239,090	241,921
Puerto Rico	.	2,833	.	.	.	.	.	.	12,000
South Carolina	4,412,186	10,266,898	12,730,788	17,710,192	30,981,211	34,984,700	22,038,202	41,847,137	44,359,662
South Dakota	4,526,024	139,056	17,845	12,721,442	27,691,643	19,720,204	34,289	4,996,254	43,312,266
Tennessee	41,219,134	24,745,148	9,321,634	5,057,994	3,254,442	6,833,051	10,898,192	2,361,000	649,837
Texas	864,505,095	501,918,706	435,627,903	380,427,005	227,044,932	170,329,849	351,426,337	123,319,547	23,003,627
Utah	.	.	.	.	.	.	12,081	.	.
Vermont	1,403,564	1,028,806	594,035	264,175	269,353	254,319	437,689	429,682	454,567
Virgin Islands	.	.	.	242,054	133,217	.	.	.	.
Virginia	427,597,503	327,187,228	699,793,313	726,250,755	784,315,854	586,236,529	698,594,949	595,598,525	699,439,644
Washington	4,136,462,553	3,691,428,435	5,477,640,695	4,637,625,695	5,382,152,728	3,775,920,088	4,048,962,755	3,787,834,446	2,388,833,273
West Virginia	.	.	.	.	203,220	.	.	6,826,399	.
Wisconsin	73,071,333	108,828,252	91,798,122	77,187,578	105,296,113	80,361,162	166,470,178	251,734,968	97,865,999

**Table 3: ERS Estimate of U.S. State Soybean Grain Export Value, Annual Trends.**

Reporter	2010	2011	2012	2013	2014	2015	2016	2017	2018
Alabama	73,954,793	49,880,016	100,062,807	118,202,214	121,590,926	95,129,081	92,216,032	74,298,255	58,119,228
Arkansas	656,092,494	667,771,548	1,152,546,130	940,414,269	916,393,282	785,441,985	865,448,375	870,569,562	647,443,142
Florida	4,036,807	2,483,538	4,594,726	6,555,230	8,268,136	5,948,273	5,431,108	3,334,028	1,686,045
Georgia	61,774,041	25,405,273	45,494,532	61,742,843	70,200,264	63,459,255	58,536,299	34,597,922	22,484,895
Illinois	2,554,986,187	2,527,639,054	3,398,123,200	2,727,309,735	3,548,909,304	2,709,289,088	3,120,453,270	3,031,785,096	2,580,703,101
Indiana	1,523,260,747	1,450,088,039	1,971,017,449	1,633,199,461	2,005,419,264	1,505,921,700	1,669,883,295	1,648,609,538	1,313,500,996
Iowa	2,815,191,908	2,562,979,009	3,572,049,324	2,874,983,078	3,057,640,118	2,459,174,009	3,239,975,779	2,750,615,573	2,161,213,295
Kansas	903,962,842	578,026,928	686,912,168	760,958,611	791,467,166	625,146,168	1,000,108,456	896,886,997	707,570,180
Kentucky	322,737,838	306,157,628	396,887,192	508,286,156	544,727,467	449,025,120	481,443,407	458,572,572	401,368,894
Louisiana	245,762,017	202,695,127	413,118,148	370,329,977	464,737,281	355,171,808	313,242,546	356,290,982	243,526,731
Maryland	100,644,748	89,329,281	152,026,467	134,034,197	129,302,126	103,549,726	113,928,474	112,077,039	91,821,259
Michigan	467,952,282	483,227,066	677,407,600	540,205,249	537,774,238	463,530,158	559,896,674	511,953,226	398,267,086
Minnesota	1,679,340,585	1,561,243,877	2,344,476,592	2,010,695,810	1,912,360,654	1,566,283,798	2,071,758,552	1,839,744,706	1,468,819,668
Mississippi	459,058,852	389,375,792	711,713,581	625,237,467	687,432,296	538,833,562	587,601,480	564,757,415	460,410,514
Missouri	1,236,163,204	1,251,885,693	1,303,713,754	1,299,608,358	1,461,805,669	1,072,389,199	1,193,439,972	1,427,604,018	1,089,777,361
Nebraska	1,248,904,459	1,601,787,258	1,789,207,269	1,480,422,594	1,712,132,436	1,367,513,294	1,717,768,259	1,548,854,368	1,218,671,884
New Jersey	15,793,422	14,323,363	25,714,741	22,838,294	24,409,352	18,185,403	18,472,958	19,622,087	15,329,284
New York	67,455,851	66,266,797	96,575,196	91,148,007	87,536,000	64,093,153	71,893,653	59,613,716	53,152,044
North Carolina	311,485,890	248,756,891	384,247,762	391,873,231	380,345,371	337,575,309	273,837,455	354,968,176	229,042,615
North Dakota	669,967,641	695,879,713	1,146,629,155	933,591,300	1,165,768,640	771,725,190	1,272,664,285	1,053,397,508	887,896,380
Ohio	1,243,966,767	1,092,616,889	1,760,589,088	1,606,358,670	1,498,114,639	1,212,274,421	1,389,462,795	1,301,332,017	1,063,309,023
Oklahoma	69,354,261	39,161,395	28,394,061	48,691,072	64,952,907	52,593,577	69,967,399	79,912,523	65,642,938
Pennsylvania	118,894,400	114,019,661	177,057,054	175,045,246	172,166,347	126,586,469	138,611,215	135,445,312	105,340,083
South Carolina	71,052,952	54,267,104	86,065,742	74,986,201	81,555,217	62,829,914	62,617,123	70,079,757	51,127,503
South Dakota	836,118,289	766,202,177	1,176,848,188	1,087,858,191	1,300,941,680	1,041,864,717	1,363,891,852	1,172,612,686	899,135,824
Tennessee	267,913,182	249,894,559	322,762,121	395,358,683	487,978,412	424,184,076	370,266,723	396,135,014	299,397,470
Texas	28,720,975	16,132,372	19,080,472	17,368,085	24,156,890	18,162,622	20,623,714	28,042,931	18,797,904
Virginia	97,855,652	94,783,928	173,307,690	156,845,329	151,542,174	109,733,219	115,564,291	116,139,028	96,696,633
West Virginia	3,781,251	3,554,284	6,813,451	6,867,591	7,605,423	6,116,857	6,625,548	6,577,270	5,522,764
Wisconsin	417,306,169	352,698,466	595,204,686	424,123,118	402,902,749	413,427,748	536,137,009	495,676,864	379,483,339

**Table 4: NDSU, FAS and ERS Soybean Grain Export Value for North Dakota.**

Year	NDSU	FAS	ERS
2004	176,417,880	16,537,825	172,576,480
2005	206,445,024	14,995,466	176,105,139
2006	246,560,080	15,204,638	249,537,724
2007	388,443,847	26,299,636	378,063,952
2008	539,176,689	31,871,809	557,316,513
2009	550,721,268	24,744,387	573,534,627
2010	748,253,829	31,812,886	669,967,641
2011	624,472,118	53,376,277	695,879,713
2012	1,294,063,389	19,991,108	1,146,629,155
2013	866,901,586	48,847,042	933,591,300
2014	1,161,115,671	108,537,241	1,165,768,640
2015	846,756,197	45,280,399	771,725,190
2016	1,251,508,675	24,666,687	1,272,664,285
2017	1,122,286,931	53,903,787	1,053,397,508
2018	885,365,842	62,543,314	887,896,380

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