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## From the Corn Belt to the *Kornkammer*: A Comparison of Agriculture in the United States and in Germany

*Examining the intricate dynamics of agriculture in Germany and the United States reveals a mix of characteristics and trends shaping their respective agricultural contexts. As major agricultural players on the world stage, the United States and Germany have a particularly important role to play in tackling challenges confronting the agricultural sector, such as climate change and biodiversity loss, structural change of the industry, and declining rural infrastructure. By better understanding the similarities and differences between the German and U.S. agricultural landscapes, policy-makers, practitioners, and other stakeholders can enhance their collaborative efforts to build more resilient food systems that meet current needs and ensure long-term sustainability. This article delves into the fundamental dimensions of each country's agricultural sectors – from land use to labor forces and more – providing essential insights into the two agricultural giants and setting the foundation for enhanced collaboration on pressing agricultural issues.*

### Introduction

Agriculture is a vital sector in both Germany and the United States, playing a pivotal role in ensuring economic and societal wellbeing. Germany, the second-largest agricultural producer in the European Union (EU), boasted a gross production value of 51 billion USD in 2021,<sup>1</sup> commanding a 14 percent share of European agricultural production.<sup>2</sup> The United States, with a long history and culture of agricultural production, is also

a major producer. In 2021, it reported a gross production value of 342 billion USD.<sup>3</sup> Contextualized globally, Germany ranked 14<sup>th</sup> and the United States ranked third in terms of agricultural gross production value in 2021.<sup>4</sup> Broadly considered, agriculture constitutes a relatively small percentage of Germany and the United States' respective GDPs and labor forces. Agricultural production's percentage of GDP in the United States amounted to just 1.1 percent in 2020; in Germany, it made up 0.8 percent in 2021.<sup>5</sup> Only 1.2 percent of the labor force in Germany worked in

<sup>1</sup> Food and Agriculture Organization of the United Nations, FAOSTAT, <https://www.fao.org/faostat/en/#data> (accessed July 28, 2023).

<sup>2</sup> Dr. Peter Pascher, Udo Hemmerling, and Simon Stork, Situationsbericht 2021/22, Trends und Fakten zur Landwirtschaft, Deutscher Bauernverband e.V., December 1, 2021, <https://www.bauernverband.de/topartikel/dbv-situationsbericht-mit-verbesserten-ergebnissen-in-2021-22> (accessed July 28, 2023).

<sup>3</sup> Food and Agriculture Organization of the United Nations, FAOSTAT.

<sup>4</sup> Ibid.

<sup>5</sup> Statistisches Bundesamt (Destatis), Basistabelle Bruttowertschöpfung: Sektor Landwirtschaft, July 21, 2022, [https://www.destatis.de/DE/Themen/Laender-Regionen/Internationales/Thema/Tabellen/Basistabelle\\_LWWertschoepfung.html](https://www.destatis.de/DE/Themen/Laender-Regionen/Internationales/Thema/Tabellen/Basistabelle_LWWertschoepfung.html) (accessed July 28, 2023).

agriculture as of 2020,<sup>6</sup> and 1.3 percent of the labor force in the United States were considered on-farm employees as of 2021.<sup>7</sup> Still, agriculture's impact on food security at both domestic and global levels is profound and its significance for the health and vitality of rural regions cannot be understated.

Given the scale and influence of their agricultural sectors, Germany and the United States emerge as natural partners in addressing crucial challenges around global food security, declining biodiversity, and climate change. In light of rising population growth and changing consumer habits worldwide, the sector is challenged to increase production, while simultaneously adapting to the consequences of climate change, such as more frequent extreme weather events and exacerbated water scarcity. The war in Ukraine and the COVID-19 pandemic have added stress to supply chains and led to rising investment costs, price volatility, and global trade conflicts. To foster transatlantic collaboration and address these challenges effectively, a deeper mutual understanding of Germany and the United States' diverse agricultural systems is essential. This article delves into fundamental aspects of the agricultural sectors in both countries – from land use to the agricultural labor force – to provide

important background on these two agricultural heavyweights.

## Land Use and Crop Cultivation

### Farmland

Almost half of Germany's land (48 percent), approximately 16.6 million hectares, is used for agricultural production, according to the 2020 Agricultural Census.<sup>8</sup> This is dwarfed by the massive amount of land used for agricultural purposes in the United States: approximately 362 million hectares according to a 2022 report by the United States Department of Agriculture (USDA),<sup>9</sup> although the percentage of land used for agricultural purposes is roughly similar (52 percent).<sup>10</sup> In Germany, arable farming made up around 70 percent of farmland in 2022; 29 percent was used for grasslands and pastures.<sup>11</sup> This contrasts with the United States, which, according to data from 2017, is more evenly split between cropland (44 percent) and pastureland (45 percent).<sup>12</sup> Although conventional farming utilizing modern technologies and machinery remains prevalent in Germany, organic farming has gained in popularity, driven by consumer demand for environmentally friendly and healthy

<sup>6</sup> United States Department of Agriculture Economic Research Service, Ag and Food Sectors and the Economy, January 26, 2023, <https://www.ers.usda.gov/data-products/ag-and-food-statistics-charting-the-essentials/ag-and-food-sectors-and-the-economy/> (accessed July 28, 2023).

<sup>7</sup> Bundesinformationszentrum Landwirtschaft, Was wächst auf Deutschlands Feldern?, <https://www.landwirtschaft.de/landwirtschaft-verstehen/wie-arbeiten-foerster-und-pflanzenbauer/was-waechst-auf-deutschlands-feldern> (accessed July 28, 2022).

<sup>8</sup> United States Department of Agriculture, Farms and Land in Farms 2021 Summary, February 2022, [https://www.nass.usda.gov/Publications/Todays\\_Reports/reports/fnl00222.pdf](https://www.nass.usda.gov/Publications/Todays_Reports/reports/fnl00222.pdf) (accessed August 10, 2023).

<sup>9</sup> United States Department of Agriculture, Farms and Land in Farms 2021 Summary, February 2022, [https://www.nass.usda.gov/Publications/Todays\\_Reports/reports/fnl00222.pdf](https://www.nass.usda.gov/Publications/Todays_Reports/reports/fnl00222.pdf) (accessed August 10, 2023).

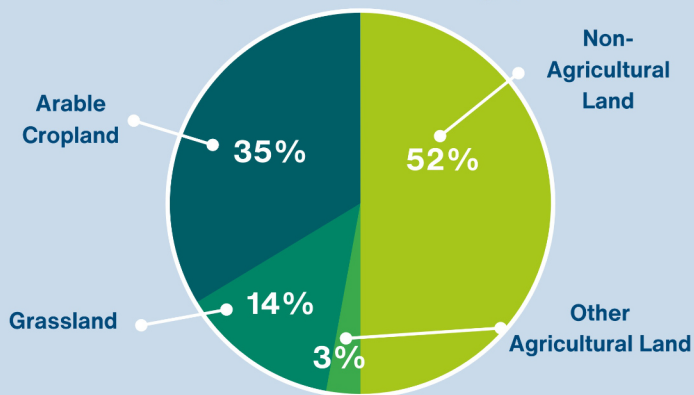
<sup>10</sup> United States Department of Agriculture Economic Research Service, Major Land Uses, [www.ers.usda.gov/topics/farm-economy/land-use-land-value-tenure/major-land-uses/](https://www.ers.usda.gov/topics/farm-economy/land-use-land-value-tenure/major-land-uses/) (accessed July 28, 2023).

<sup>11</sup> Destatis Statistisches Bundesamt, Landwirtschaftliche Bodennutzung nach ausgewählten Hauptnutzungsarten, November 22, 2022, <https://www.destatis.de/DE/Themen/Branchen-Unternehmen/Landwirtschaft-Forstwirtschaft-Fischerei/Feldfruechte-Gruenland/Tabellen/flaechen-hauptnutzungsarten.html?nn=371820> (accessed August 10, 2023).

<sup>12</sup> United States Department of Agriculture, 2017 Census of Agriculture Highlights, Farms and Farmland, 2019, [https://www.nass.usda.gov/Publications/Highlights/2019/2017Census\\_Farms\\_Farmland.pdf](https://www.nass.usda.gov/Publications/Highlights/2019/2017Census_Farms_Farmland.pdf) (accessed July 28, 2023).

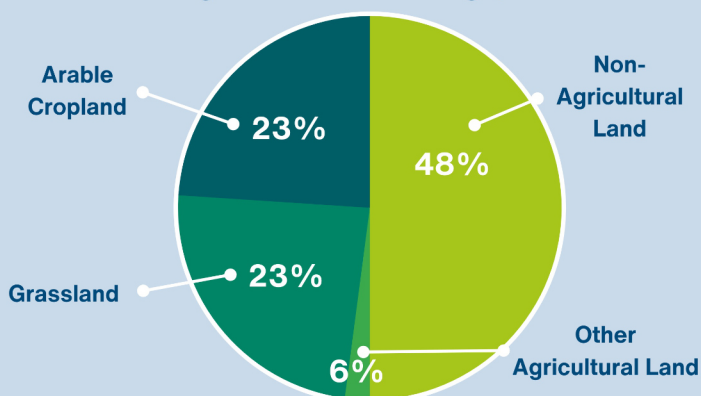


### German Agricultural Land Usage, 2020



Source: Bundesinformationszentrum Landwirtschaft, Was wächst auf Deutschlands Feldern?, 2023.

### U.S. Agricultural Land Usage, 2022



Source: USDA Economic Research Service, Major Land Uses, 2019.

food options. Of the country's farmland, 1.6 million hectares or 9.6% of its total agricultural land produced used organic practices as of 2022.<sup>13</sup> This statistic

qualifies Germany as the fourth largest organic farming and conversion area in the EU.<sup>14</sup> These figures far exceed the share of organic production in the United States, where conventional farming techniques are dominant. There, only 0.6 percent of all agricultural land was dedicated to organic production in 2022.<sup>15</sup> However, this figure is increasing along with demand for more organic products. According to a 2021 USDA survey, the number of organic farms increased by around 3,000 between 2008 and 2021.<sup>16</sup> During the same time frame, the total land area using organic practices increased by over 3 million hectares.<sup>17</sup>

### Crop Cultivation

The majority of cropland in the United States is used for certain core crops. Based on the 2017 Agricultural Census, soybeans and corn cover 56.6 percent of U.S. cropland; with the addition of wheat, the total comes to 64.7 percent.<sup>18</sup> A huge proportion of these crops are used as animal feed for livestock production across the United States. A 2018 Bloomberg Report estimated that as much as 41 percent of all land in the United States is used for livestock production including both pastures and feed production.<sup>19</sup> In Germany, grains make up the largest proportion of arable land. In 2020, winter wheat comprised 23.7 percent of all cropland, followed by silage corn at 19.7 percent and winter oilseed rape at 8.2 percent.<sup>20</sup> Other

<sup>13</sup> Food and Agriculture Organization of the United Nations, FAOSTAT.

<sup>14</sup> Ibid.

<sup>15</sup> Ibid.

<sup>16</sup> Terry Matlock, The Ever-expanding Industry of Certified Organics, U.S. Department of Agriculture, <https://www.usda.gov/media/blog/2023/01/18/ever-expanding-industry-certified-organics#:~:text=In%202008%2C%20there%20were%2014%2C540,4.9%20million%20certified%20organic%20acres> (accessed July 28, 2023).

<sup>17</sup> Ibid.

<sup>18</sup> Kaitlyn Spangler, Emily K. Burchfield, and Britta Schumacher, Past and Current Dynamics of U.S. Agricultural Land Use and Policy, *Frontiers in Sustainable Food Systems*, July 21, 2020 (accessed August 10, 2023).

<sup>19</sup> Dave Merrill and Lauren Leatherby, Here's How America Uses Its Land, Bloomberg, <https://www.bloomberg.com/graphics/2018-us-land-use/> (accessed July 28, 2023).

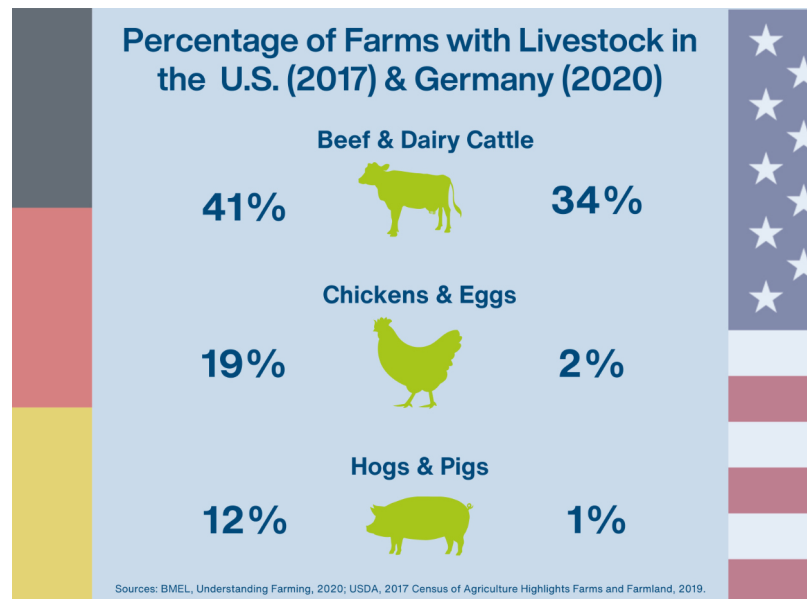
<sup>20</sup> Bundesministerium für Ernährung und Landwirtschaft (BMEL), Daten und Fakten, Land-, Forst- und Ernährungswirtschaft mit Fischerei und Wein- und Gartenbau, May 2022, [https://www.bmel.de/SharedDocs/Downloads/DE/Broschueren/daten-fakten-2022.pdf?\\_\\_blob=publica](https://www.bmel.de/SharedDocs/Downloads/DE/Broschueren/daten-fakten-2022.pdf?__blob=publica) (accessed July 28, 2023).

important grains include barley and rye.<sup>21</sup> As in the United States, many of these grains, alongside grassland (pastures and meadows), are used to produce animal feed. Approximately 60 percent of agricultural land in Germany was used for this purpose in 2020 and 2021.<sup>22</sup>

A much smaller share of agricultural land in both countries is used for other crops. In Germany, for example, only 2.9 percent was used for vegetables and fruit production in 2022. Vegetables produced on German soil include potatoes and asparagus, and to a much lesser extent carrots, lettuces, and onion. Similarly, fruit production is limited to several core products, including apples, strawberries, and cherries. Vineyards and hops are another important set of crops, conducive to the climates in southern Germany and the Rhineland. According to reports from 2023, over five percent of European wine and a third of global hops are produced in Germany.<sup>23</sup> In the United States, the 2017 Agricultural Census found that specialty crops, to include vegetables, fruits, nuts, and nursery crops make up three percent of total agricultural land.<sup>24</sup> In contrast to Germany, whose climate is comparatively uniform, the United States' environmental conditions and agricultural production vary wildly between regions, resulting in a wide array of specialty crops produced, from citrus fruits and sweet potatoes to peanuts and maple syrup.

## Livestock Production

Livestock farming is also prominent in both countries. In Germany, the primary focus is on dairy cows, pigs, and poultry. In 2020, 64 percent of agricultural operations held livestock; this represents a circa 22 percent reduction in farms with livestock compared to the previous agricultural census in 2010.<sup>25</sup> The United States' primary livestock commodities include beef cattle, pigs, and poultry.<sup>26</sup> As in Germany, a majority of U.S. farms have livestock. In both countries, dairy and beef cattle are the most common type of livestock held; 41 percent of all farms in Germany had cattle and dairy cows as of 2016.<sup>27</sup> As of 2020, there were on average 104 beef cattle and 72 dairy cows per farm.<sup>28</sup> The number of dairy



<sup>21</sup> Bundesinformationszentrum Landwirtschaft, 2023.

<sup>22</sup> Ibid.

<sup>23</sup> Ibid.

<sup>24</sup> United States Department of Agriculture, 2017 Census of Agriculture Highlights, Farms and Farmland, 2019.

<sup>25</sup> Statistische Bundesamt (Destatis), Viehhaltung im letzten Jahrzehnt: Weniger, aber größere Betriebe, July 2, 2021, [https://www.destatis.de/DE/Presse/Pressemitteilungen/2021/07/PD21\\_N043\\_41.html](https://www.destatis.de/DE/Presse/Pressemitteilungen/2021/07/PD21_N043_41.html) (accessed July 28, 2023).

<sup>26</sup> United States Department of Agriculture, Agricultural Statistics 2021, 2021, [https://downloads.usda.library.cornell.edu/usda-esmis/files/j3860694x/gq67m183k/np194m208/2021\\_Agricultural\\_Statistics\\_Book.pdf](https://downloads.usda.library.cornell.edu/usda-esmis/files/j3860694x/gq67m183k/np194m208/2021_Agricultural_Statistics_Book.pdf) (accessed July 28, 2023).

<sup>27</sup> Federal Ministry of Food and Agriculture (BMEL) Division 721, Understanding Farming, Facts and figures about German farming, November 2020, [https://www.bmel.de/SharedDocs/Downloads/EN/Publications/UnderstandingFarming.pdf?\\_\\_blob=publicationFile](https://www.bmel.de/SharedDocs/Downloads/EN/Publications/UnderstandingFarming.pdf?__blob=publicationFile) (accessed July 28, 2023).

<sup>28</sup> Statistische Bundesamt (Destatis), Viehhaltung im letzten Jahrzehnt: Weniger, aber größere Betriebe, 2021.





farms, which made up 32 percent of livestock farms in 2020, has decreased significantly, by 40 percent since 2010, although the number of dairy cows decreased by only six percent.<sup>29</sup> In the United States, the 2017 Agricultural Census indicated that a slightly lower, but still significant 34 percent of farms specialize in cattle and dairy.<sup>30</sup> There were on average 44 beef cattle per farm, however this accounts for many operations where cattle is not the main source of revenue. Larger operations with more than 100 beef cattle per farm account for 56 percent of overall beef cattle stock, though making up only 9.9 percent of farms.<sup>31</sup> There were a much more considerable median 1,300 dairy cattle per farm in 2017.<sup>32</sup> The herd size in the dairy industry has increased substantially in recent decades; in 1987, the average dairy herd size was only 80.<sup>33</sup>

In Germany, the trend of concentration of more livestock in fewer operations extends to hog farming. In 2020, approximately twelve percent of livestock farms held swine.<sup>34</sup> This is a 47 percent decrease compared to 2010,

although the population of swine in Germany reduced by only five percent in the same time frame.<sup>35</sup> As a result, the average number of hogs held per farm rose from 459 to 826 in a period of ten years, reflecting a significant structural change in the industry.<sup>36</sup> In the United States, farms producing pigs make up just one percent of all farms, although the country is still one of the top producers of pork and pork products worldwide.<sup>37</sup> Here too, there has been a shift to fewer but larger operations. Between 1990 and 2020, there has been a 70 percent reduction in the number of swine holding operations but a growth in size of operation.<sup>38</sup> On average, farms with pigs had roughly 1,100 head per farm in 2020.<sup>39</sup>

Finally, both countries have substantial poultry industries, specifically for chicken and egg production. In Germany, this sector constituted approximately 19 percent of farms in 2020.<sup>40</sup> However, between 2010 and 2020, the number of farms raising chickens declined by 15 percent.<sup>41</sup> In the United States, two percent of farms produce poultry and

<sup>29</sup> Ibid.

<sup>30</sup> United States Department of Agriculture, 2017 Census of Agriculture Highlights, Farms and Farmland, 2019.

<sup>31</sup> U.S. Department of Agriculture Economic Research Service, Cattle & Beef, Sector at a Glance, <https://www.ers.usda.gov/topics/animal-products/cattle-beef/sector-at-a-glance/#:~:text=Based%20on%20the%20USDA%2C%20NASS,income%20to%20off%2Dfarm%20employment,t.> (accessed July 28, 2023).

<sup>32</sup> James MacDonald, Jonathan Law, and Roberto Mosheim, Consolidation in U.S. Dairy Farming, United States Department of Agriculture Economic Research Service, July 2020, [https://www.ers.usda.gov/webdocs/publications/98901/err%20274\\_summary.pdf?v=8132](https://www.ers.usda.gov/webdocs/publications/98901/err%20274_summary.pdf?v=8132) (Accessed July 28, 2023)

<sup>33</sup> Ibid.

<sup>34</sup> Bundesministerium für Ernährung und Landwirtschaft (BMEL), Daten und Fakten, 2022.

<sup>35</sup> Statistisches Bundesamt (Destatis), Viehhaltung im letzten Jahrzehnt: Weniger, aber größere Betriebe, 2021.

<sup>36</sup> Ibid.

<sup>37</sup> United States Department of Agriculture, 2017 Census of Agriculture Highlights, Farms and Farmland, 2019.

<sup>38</sup> United States Department of Agriculture Economic Research Service, Hogs & Pork, Sector at a Glance, <https://www.ers.usda.gov/topics/animal-products/hogs-pork/sector-at-a-glance/> (accessed July 28, 2023).

<sup>39</sup> Paige Carlson, Hog Operation Farm Size Trends by Number, Farm Journal's Pork, September 20, 2022, <https://www.porkbusiness.com/news/hog-production/hog-operation-farm-size-trends-number> (accessed July 28, 2023).

<sup>40</sup> Bundesministerium für Ernährung und Landwirtschaft (BMEL), Daten und Fakten, 2022.

<sup>41</sup> Statistische Ämter des Bundes und der Länder, Viehbestände in Deutschland, Landwirtschaftszählung 2020, December 22, 2021, <https://www.giscloud.nrw.de/arcgis/apps/storymaps/stories/1391a24920d04deb9133a10000c45067> (accessed July 28, 2023).

eggs using just one percent of overall farmland, according to agricultural census data from 2017.<sup>42</sup>

### Regional Variation

There is significant regional variation in agricultural production in both countries due to varied climate and soil conditions, agricultural traditions, and geographic features. In Germany, there is a particular focus on arable farming producing grains in the eastern part of the country. The south of Germany is better suited for specialty crops, due to the climate, soil, and geographic conditions. Fruits are generally centered around specific climate-appropriate regions, such as around Lake Constance in southern Germany and in a region called the “Alte Land” near Hamburg.<sup>43</sup> Livestock operations show even greater regional concentration. In 2020, almost half (47 percent) of cattle and dairy cows were in the federal states of Bavaria and Lower Saxony.<sup>44</sup> These regions are particularly suitable due to their better conditions for feed production and a higher prevalence of grassland that is not suitable for arable farming. Similarly, there is a clear geographic concentration of pig farming, with 59 percent of all operations found in Lower Saxony and North Rhine-Westphalia.<sup>45</sup> Lower Saxony has the highest concentration of poultry and egg production, with 36 percent of overall holding capacity.<sup>46</sup>

There are also notable geographic concentrations in the United States. The

U.S. Midwest, often referred to as the “Corn Belt”, is known for its extensive corn and soybean production. In the southwestern United States (Southern Plains region), the climate is semi-arid and therefore ideal for wheat cultivation and livestock rearing.<sup>47</sup> The southeastern United States benefits from a subtropical climate, allowing the region to produce crops such as cotton, rice, and citrus fruits.<sup>48</sup> The Northeast offers a humid continental climate; its most prominent agricultural products are a combination of livestock, corn, soybeans, and fruit, such as apples.<sup>49</sup> Finally, the Western region enjoys the most diverse range of climates and agricultural production, from desert to near rainforest conditions and, thus, has enormous variety in agricultural production, from industrial wheat and corn to artisanal almond and grape production.<sup>50</sup>

## Farms and the Agricultural Workforce

### Farm Size

Germany and the United States boast a diverse landscape of farms, characterized by various sizes and ownership models, which shape the modern agricultural profession. As of 2022, there were almost 263,000 farms countrywide in Germany,<sup>51</sup> compared to the over two million in the United States

<sup>42</sup> United States Department of Agriculture, 2017 Census of Agriculture Highlights, Farms and Farmland, 2019.

<sup>43</sup> Bundesinformationszentrum Landwirtschaft, 2023.

<sup>44</sup> Statistische Ämter des Bundes und der Länder, Viehbestände in Deutschland, 2021.

<sup>45</sup> Ibid.

<sup>46</sup> Ibid.

<sup>47</sup> Northeast Agriculture: 2021 Trends and Data Report, AgAmerica Lending, 2021, <https://agamerica.com/farm-publications/northeast-agricultural-trends-report/> (accessed August 11, 2023).

<sup>48</sup> Southeast Agriculture: 2021 Trends and Data Report, AgAmerica Lending, 2021, <https://agamerica.com/farm-publications/northeast-agricultural-trends-report/> (accessed August 11, 2023).

<sup>49</sup> Northeast Agriculture: 2021 Trends and Data Report, 2021.

<sup>50</sup> West Agriculture: 2021 Trends and Data Report, AgAmerica Lending, 2021, AgAmerica Lending, 2021, <https://agamerica.com/wp-content/uploads/2023/05/2021-West-Agriculture.pdf> (accessed August 11, 2023).

<sup>51</sup> Statistisches Bundesamt (Destatis), Agricultural Holdings by their Legal Form, August 20, 2020, <https://>

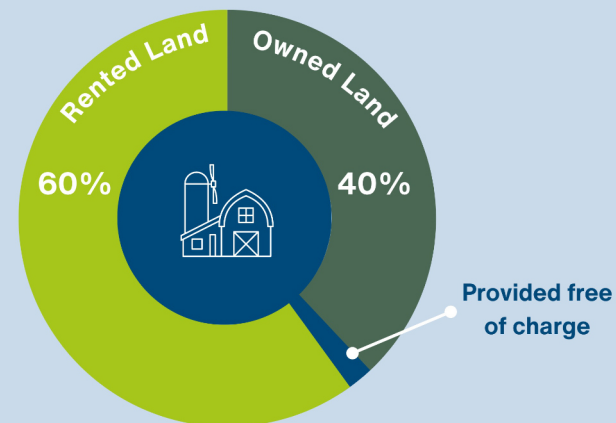


as of the last agricultural census in 2017.<sup>52</sup> Farms in the United States are on average larger than those in Germany; in 2022, the average farm size was 180 hectares,<sup>53</sup> compared to Germany's average of 61 hectares of land in 2016.<sup>54</sup> As of 2022, the vast majority – 94 percent – of agricultural holdings in Germany consisted of less than 200 hectares, and 85 percent were under 100 hectares.<sup>55</sup> U.S. farms range vastly in scale. Unlike in Germany, the USDA denotes size of farm based on financial status, not land usage. Small-scale farms are defined as those earning less than 100,000 USD per year. In 2021, these accounted for 82 percent of all farms but just 30 percent of land usage.<sup>56</sup> In contrast, mid-scale farms (earning between 100,000 and 500,000 USD) accounted for eleven percent of farms and 29 percent of farmland.<sup>57</sup> Large-scale farms (earning more than 500,000 USD) accounted for just seven percent of farms but a staggering 41 percent of land usage.<sup>58</sup>

The size of farms in Germany has increased steadily since 1970, when the average farm consisted of just eleven hectares, representing a shift to more industrial scale farming.<sup>59</sup> This is further evidenced by the fact that a majority of agricultural land in the country, almost 63 percent, was held by larger scale farms exceeding 100 hectares in 2022.<sup>60</sup> There is evidence that per farm land usage is rising. Between 2010 and 2022, the

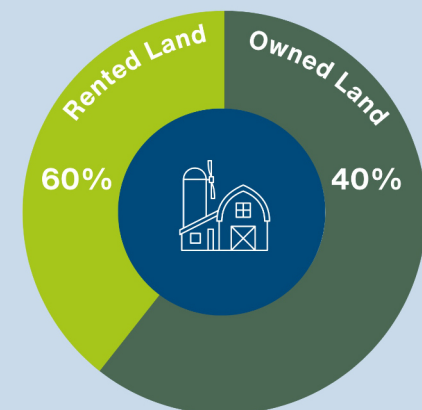
percentage of agricultural land held by farming operations with total landholding greater than 100 hectares grew by almost 14 percent.<sup>61</sup> Smaller family farms

### Ownership of German Farmland, 2020



Source: Destatis, Wem gehört die Landwirtschaft?, 2021.

### Ownership of U.S. Farmland, 2017



Source: USDA Economic Research Service, Farmland Ownership and Tenure, 2022.

<sup>52</sup> United States Department of Agriculture, 2017 Census of Agriculture Highlights, Farms and Farmland, 2019.

<sup>53</sup> United States Department of Agriculture Economic Research Service, Farming and Farm Income, March 14, 2023, <https://www.ers.usda.gov/data-products/ag-and-food-statistics-charting-the-essentials/farming-and-farm-income/> (accessed July 28, 2023).

<sup>54</sup> Federal Ministry of Food and Agriculture (BMEL) Division 721, Understanding Farming, Facts and figures about German farming, November 2020, [https://www.bmel.de/SharedDocs/Downloads/EN/Publications/UnderstandingFarming.pdf?\\_\\_blob=publicationFile](https://www.bmel.de/SharedDocs/Downloads/EN/Publications/UnderstandingFarming.pdf?__blob=publicationFile) (accessed July 28, 2023).

<sup>55</sup> Statistisches Bundesamt (Destatis), Agricultural Holdings and Utilised Agricultural Area by Size of the Utilised Agricultural Area, November 22, 2022, <https://www.destatis.de/EN/Themes/Economic-Sectors-Enterprises/Agriculture-Forestry-Fisheries/Agricultural-Holdings/Tables/agricultural-holdings-and-utilised-agricultural-area-by-size-of-the-utilised-agricultural-area.html> (accessed July 28, 2023).

<sup>56</sup> United States Department of Agriculture, Farms and Land in Farms 2021 Summary, February 2022.

<sup>57</sup> Ibid.

<sup>58</sup> Ibid.

<sup>59</sup> Federal Ministry of Food and Agriculture (BMEL) Division 721, Understanding Farming, Facts and figures about German farming, 2020.

<sup>60</sup> Statistisches Bundesamt (Destatis), Agricultural Holdings and Utilised Agricultural Area by Size of the Utilised Agricultural Area, 2022.

<sup>61</sup> Ibid.

remain an important feature of German agriculture, but this trend towards consolidation indicates broader structural shifts in the agricultural sector.

These shifts toward consolidation are also evident in the United States. Between 1987 and 2017, the share of acres operated by midsize farms has decreased consistently from 57 to 33 percent of all cropland. Conversely, the share of acres operated by large farms increased from 15 percent to 41 percent during the same time frame. Farming operations with livestock have also consolidated, although this has happened less consistently over time and has impacted various types of livestock differently. Dairy cow herds, for example, were 16 times larger in 2017 than three decades earlier. Egg producing operations were ten times larger on average and quantity sales of pigs and hogs was nearly 43 times greater in 2017, compared to 1987. Beef cow operations, on the other hand, have experienced little consolidation in the same period; a typical herd size in 1987 was 89, compared to 120 in 2017.<sup>62</sup>

### Ownership Structures

Many farms in Germany and the United States are family-owned and operated. Of the approximately two million farms in the United States, in 2018, 98 percent were family farms, meaning the principal operator and people related to them own a majority of the business.<sup>63</sup> Family farms constituted 88 percent of production in the same year.<sup>64</sup> These farms are

supplemented by commercial operations. In Germany, sole proprietorships, meaning that operations are managed by one person and are typically considered family farms, made up 87 percent of agricultural operations as of 2020. However, these farms cultivated only 62 percent of overall agricultural land in Germany in the same year. A much smaller share, at eleven percent, were managed by partnerships, and a further two percent are operated by “legal entities”, such as limited liability companies (GmbH), stock companies (AG), and agricultural cooperatives (Genossenschaften). There are notable geographic differences: in eastern Germany, the share of sole proprietorships is just 70 percent compared to 88.6 percent in western Germany, whereas legal entities make up 15.6 percent in eastern Germany compared to under one percent of all agricultural operations in western Germany. Even more starkly disparate is the share of land operated by the various ownership forms. In eastern Germany, sole proprietorships hold 27.5 percent of agricultural land compared to 79.4 percent in western Germany. Comparatively, 49.8 percent of land is managed by legal entities in eastern Germany compared to 1.2 percent in western German federal states.<sup>65</sup>

While the prevalence of family farming in the United States and Germany is similar, ownership structures reveal greater distinctions. According to the most recent U.S. Agriculture Census in 2017

<sup>62</sup> James M. MacDonald, Consolidation in U.S. Agriculture Continues, United States Department of Agriculture Economic Research Service, February 3, 2020, <https://www.ers.usda.gov/amber-waves/2020/february/consolidation-in-us-agriculture-continues/> (accessed July 28, 2023).

<sup>63</sup> Christine Whitt, A Look at America's Family Farms, United States Department of Agriculture, January 23, 2020, <https://www.usda.gov/media/blog/2020/01/23/look-americas-family-farms> (accessed July 28, 2023).

<sup>64</sup> *Ibid.*

<sup>65</sup> top agrar online, Der Landwirt als Chef noch häufigste Unternehmensform, DBV-Situationsbericht, January 2, 2021, <https://www.topagrar.com/management-und-politik/news/der-landwirt-als-chef-noch-haeufigste-unternehmensform-12775387.html#:~:text=Nach%20Ergebnissen%20der%20Landwirtschaftsz%C3%A4hlung%202020,DBV%2DSituationsbericht%202021%2F22> (accessed July 28, 2023).





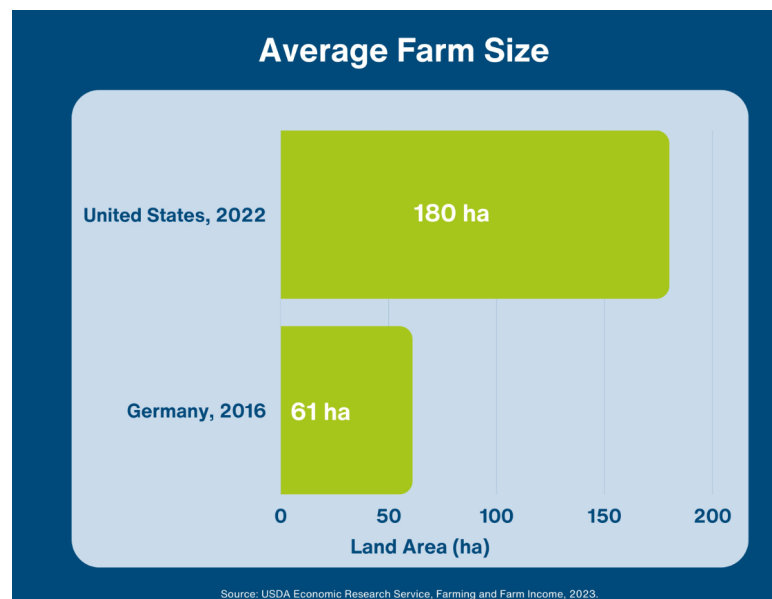
just over 60 percent of all agricultural land is owned by the farmer who operates it, while 39 percent of farmland is leased to farmers by landlords.<sup>66</sup> The 2017 census also found that of the rented farmland in the United States, 80 percent is owned by non-operator landlords, who have no active role in production.<sup>67</sup> Fifty-four percent of arable land was rented, as opposed to just one quarter of pastureland.<sup>68</sup> Rented farmland is particularly prevalent in areas producing cash crops, such as corn, soybeans, wheat, rice, and cotton. Thus, as of 2012, the highest rates of land rental were in the Midwest and Plains regions of the United States, whereas land ownership is highest in the northeastern and western parts of the country.<sup>69</sup> The amount of agricultural land owned and rented to operators by non-farming entities will likely trend upwards as more firms and individuals begin buying farmland as investments.

The breakdown of land ownership is starkly different in Germany, with a much higher percentage of rented farmland. As of the 2020 Agricultural Census, 60 percent of agricultural land in Germany was leased, 38 percent was owned, and roughly two percent was provided at no charge.<sup>70</sup> There is a notable difference in ownership comparing eastern and western German federal states. In eastern Germany, 68 percent of agricultural land was leased compared with 56 percent in western Germany in

2020.<sup>71</sup> However, this gap seems to be shrinking, as the share of owned land in eastern Germany grows over time.

### Farm Income

Farmers in the United States have, on the whole, higher incomes than the overall median income. In 2021, the median household income for farmers was 92,000 USD, compared to nearly 71,000 USD for all U.S. households.<sup>72</sup> In the same year, the vast majority (89 percent) of farms were family farms with household incomes of less than 350,000 USD per year.<sup>73</sup> Notably, households in this income bracket typically also rely on non-farm sources of income, to include active earned income from other careers



<sup>66</sup> United States Department of Agriculture Economic Research Service, Farmland Ownership and Tenure, May 16, 2022, <https://www.ers.usda.gov/topics/farm-economy/land-use-land-value-tenure/farmland-ownership-and-tenure/> (accessed July 28, 2023).

<sup>67</sup> Ibid.

<sup>68</sup> Ibid.

<sup>69</sup> Daniel Bigelow, Allison Borchers, and Todd Hubbs, U.S. Farmland Ownership, Tenure, and Transfer, United States Department of Agriculture Economic Research Service, Economic Information Bulletin Number 161, August 2016, <https://www.ers.usda.gov/webdocs/publications/74672/eib-161.pdf> (accessed July 28, 2023).

<sup>70</sup> Statistisches Bundesamt (Destatis), Wem gehört die Landwirtschaft? Bedeutung von Unternehmensgruppen erstmals untersucht, Pressemitteilung Nr. N 047, July 20, 2021, [https://www.destatis.de/DE/Presse/Pressemitteilungen/2021/07/PD21\\_N047\\_41.html](https://www.destatis.de/DE/Presse/Pressemitteilungen/2021/07/PD21_N047_41.html) (accessed July 28, 2023).

<sup>71</sup> Ibid.

<sup>72</sup> United States Department of Agriculture Economic Research Service, Farming and Farm Income, 2023.

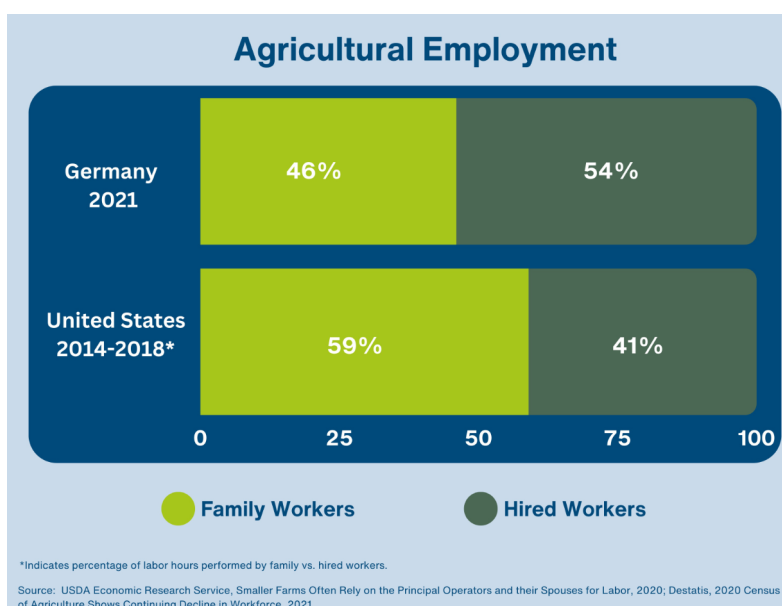
<sup>73</sup> Ibid.

(wages and salaries) and passive income (investments).<sup>74</sup> Only nine percent of family farms earned more than 350,000 USD per year.<sup>75</sup> In Germany, twenty-five percent of farming operations earn less than 12,000 EUR (13,000 USD) per year, while the top 25 percent earned more than 55,000 EUR (60,000 USD) between 2018 and 2021.<sup>76</sup> The average income for farm households came to 52,400 EUR (57,200 USD) per year between 2013 and 2018.<sup>77</sup> This contrasts with the situation in the United States, in that the average income for farmer households in Germany is lower than the average gross household income country wide, which was just over 58,000 EUR (63,000 USD) in 2018.<sup>78</sup> When breaking down the average household income for each family member that works on the farm, the average income per person was around 32,000 EUR (35,000 USD) per year between 2013 and 2018.<sup>79</sup> As a comparison, in 2021, the average personal income for workers across industry was 43,200 EUR (47,000 USD) per year.<sup>80</sup>

### Labor Force

The percentage of the population working in agriculture in both the United States and Germany has decreased substantially in recent decades and is, today, roughly the same in both countries. According to the German 2020

Agricultural Census, there were around 938,000 employed in the agricultural sector.<sup>81</sup> This represents approximately 1.2 percent of the overall workforce and is approximately 15 percent less than was reported in the census ten years prior.<sup>82</sup> Of the United States employed population, approximately 1.3 percent was employed on-farm (2.6 million jobs) as of 2021.<sup>83</sup>



In keeping with the overwhelming proportion of family farms in the United States, the USDA estimates that between 2014 and 2018 a majority of

<sup>74</sup> Ibid.

<sup>75</sup> Ibid.

<sup>76</sup> Eva-Charlotte Weber, Raphaela Ellßel, and Heiko Hansen, Farm Income, Thünen Institut, February 1, 2023, <https://www.thuenen.de/en/thuenen-topics/income-and-employment/farm-income-a-perennially-hot-topic-1> (accessed July 28, 2023).

<sup>77</sup> Federal Ministry of Food and Agriculture (BMEL) Division 721, Understanding Farming, Facts and figures about German farming, 2020.

<sup>78</sup> Bundeszentrale für politische Bildung, Einkommen privater Haushalte, October, 14, 2020, [www.bpb.de/kurz-knapp/zahlen-und-fakten/soziale-situation-in-deutschland/61754/einkommen-privater-haushalte/](http://www.bpb.de/kurz-knapp/zahlen-und-fakten/soziale-situation-in-deutschland/61754/einkommen-privater-haushalte/) (accessed August 16, 2023).

<sup>79</sup> Federal Ministry of Food and Agriculture (BMEL) Division 721, Understanding Farming, Facts and figures about German farming, 2020.

<sup>80</sup> Christine Kreder, Einkommen: So groß ist das Gehaltsgefälle in Deutschland, Capital, October 2, 2021, <https://www.capital.de/karriere/gehaltsatlas-gehalt-hier-verdienen-die-deutschen-am-meisten> (accessed July 28, 2023).

<sup>81</sup> Statistisches Bundesamt (Destatis), Landwirtschaftszählung 2020 – Zahl der Arbeitskräfte weiterhin rückläufig, 2021.

<sup>82</sup> Ibid.

<sup>83</sup> United States Department of Agriculture Economic Research Service, Ag and Food Sectors and the Economy, January 26, 2023, <https://www.ers.usda.gov/data-products/ag-and-food-statistics-charting-the-essentials/ag-and-food-sectors-and-the-economy/> (accessed July 28, 2023).



labor hours were performed by self-employed operators and their family members (59 percent on average).<sup>84</sup> Forty-one percent of labor hours were worked by non-family, hired workers.<sup>85</sup> In Germany, the share of family members who support the family farming operation stood at 46 percent in 2021.<sup>86</sup> Seasonal and permanently employed non-family workers made up 54 percent of the labor force in the same year.<sup>87</sup> Given the divergent ownership structures of farms in eastern and western Germany, there is a much higher percentage of non-family, permanent employees and seasonal workers (81 percent) and fewer family members (19 percent) in eastern Germany.<sup>88</sup>

There are clear tendencies regarding gender and age in the agricultural sector, which tends to be majority male and older. In 2020, thirty-six percent of the agricultural labor force in Germany was over the age of 55, compared to 23 percent of the workforce in other sectors.<sup>89</sup> Similarly, in the United States, the average age of farmers in 2017 was 57.5.<sup>90</sup> Only eight percent of all producers were under the age of 35, compared with 34 percent who are over age 65 in 2017.<sup>91</sup> These statistics underscore concerns about the future of the farming industry,

as it faces difficulties attracting younger generations to the profession.

The percentage of women that make up the U.S. and German agricultural sectors is roughly the same, approximately 36 percent in 2017<sup>92</sup> and 33 percent in 2020,<sup>93</sup> respectively. Remarkably, this represents a nearly 27 percent increase over the previous United States agricultural census in 2012.<sup>94</sup> However, these figures belie the fact that women are less likely to have leadership or higher-level decision-making roles. Only one in nine German farms was led by a woman in 2020.<sup>95</sup> Although this statistic is not available for the United States, other reports show that women self-report being less likely to have a role in decisions related to land use, crops, and livestock and are more heavily involved in day-to-day decisions, financial management, and record keeping.<sup>96</sup>

## Agricultural Productivity

### Overall Production

Agricultural production makes up just over one percent of GDP in the United States (according to data from 2020) and 0.8 percent in Germany (according to data from 2021).<sup>97</sup>

<sup>84</sup> United States Department of Agriculture Economic Research Service, Smaller Farms Often Rely on the Principal Operators and their Spouses for Labor, while Larger Farms Rely on Hired Labor, December 39, 2020, <https://www.ers.usda.gov/data-products/chart-gallery/gallery/chart-detail/?chartId=100131> (accessed July 28, 2023).

<sup>85</sup> Ibid.

<sup>86</sup> Statistisches Bundesamt (Destatis), Landwirtschaftszahlung 2020 – Zahl der Arbeitskräfte weiterhin rückläufig, 2021.

<sup>87</sup> Ibid.

<sup>88</sup> Ibid.

<sup>89</sup> top agrar online, Gut ein Drittel der Landwirte ist älter als 55 Jahre, January 18, 2020, <https://www.topagrar.com/management-und-politik/news/gut-ein-drittel-der-landwirte-ist-aelter-als-55-jahre-11955901.html> (accessed July 28, 2023).

<sup>90</sup> United States Department of Agriculture, 2017 Census of Agriculture Highlights, Farm Producers, April 2019, [https://www.nass.usda.gov/Publications/Highlights/2019/2017Census\\_Farm\\_Producers.pdf](https://www.nass.usda.gov/Publications/Highlights/2019/2017Census_Farm_Producers.pdf) (accessed July 28, 2023).

<sup>91</sup> Ibid.

<sup>92</sup> Ibid.

<sup>93</sup> Statistisches Bundesamt (Destatis), Landwirtschaftszahlung 2020 – Zahl der Arbeitskräfte weiterhin rückläufig, 2021.

<sup>94</sup> Ibid.

<sup>95</sup> Ibid.

<sup>96</sup> United States Department of Agriculture, 2017 Census of Agriculture Highlights, Farm Producers, 2019.

<sup>97</sup> Statistisches Bundesamt (Destatis), Basistabelle Bruttowertschöpfung: Sektor Landwirtschaft, 2022.

Although agricultural output makes up a relatively small share of overall production value of each country, the value increases when considering the related industries which agriculture supports. Sectors related to agricultural inputs, such as manufacturing, service providers and other inputs, and sectors related to food and beverage manufacturing and food service are reliant on agriculture. In Germany in 2020, the entire agribusiness sector produced a value of 471.5 billion EUR (513 billion USD) or six percent of GDP.<sup>103</sup> In 2021, agriculture-related industries made up a similar share of U.S. GDP at 5.4 percent (over 1 trillion USD).<sup>104</sup>

Both Germany and the United States have rich agricultural export and import markets. Globally, the United States was the top exporter and the second largest importer (after China) of agricultural products in 2021. Germany was the fourth largest exporter (after the United States, the Netherlands, and Brazil) and the third largest importer (after China and the United States). In 2021, U.S. agricultural exports amounted to 194 billion and imports made up 170 billion USD. In the same year, Germany had agricultural exports amounting to almost 89 billion USD and imports of nearly 112 billion USD in 2020. Within the EU, Germany plays an important economic role as the largest agricultural importer and second largest agricultural exporter.<sup>105</sup>

The United States' main exports include grains and feeds, soybeans, livestock products, tree nuts, fruits, and vegetables. The top imported products include fruits, vegetables, tree nuts, wine, spirits, essential oils, and nursery stock (52 percent), while tropical products like coffee and cocoa make up 15 percent of all imports in 2021. The United States' top export trading partners in 2021 included China, Canada, Mexico, Japan and the EU, accounting for 61 percent of all exports. The United States imports the most products from Canada, the EU, and Mexico, based on data between 2017 and 2021.<sup>106</sup>

#:~:text=The%20leading%20U.S.%20agricultural%20exports,are%20major%20U.S.%20trade%20partners (accessed July 28, 2023).





The top exports of Germany in 2017 included meat, milk and dairy, wheat and wheat products, as well as chocolate products. On the country's top list of imports in the same year were oil seeds, meat, milk and dairy, wheat and wheat products, and fruits. More than three quarters of German exports went to other EU member countries in 2017, based on 2017 reports. Leading the pack is the Netherlands, France, Italy, Austria, and Poland. The top recipients of German exports outside of the EU in the same year include Switzerland, the United States, and China.<sup>107</sup> According to the Federal Ministry for Food and Agriculture, the Netherlands also accounted for the majority of agricultural imports into Germany, followed by the United States, Italy, and France in 2022.<sup>108</sup>

### Bilateral Trade

The United States and Germany are themselves important agricultural trading partners. The German Federal Ministry of Food and Agriculture estimated that U.S. exports of agricultural goods to Germany amounted to three billion EUR (3.3 billion USD) in 2022; top products included soy beans, nuts and dried fruits, fish, spirits, and wine.<sup>109</sup> U.S. imports of agricultural products from Germany totaled 2.5 billion EUR (2.7 billion USD); top products include coffee, sugar, chocolate and confectionaries.<sup>110</sup> For Germany, the United States was the second-largest

trading partner outside of the EU after Switzerland in 2018.<sup>111</sup>

The EU, which is responsible for trade and agricultural policy for Germany and other member countries, was the fourth largest export market for the United



States in 2021 with bilateral agricultural trade amounting to 49.4 billion USD.<sup>112</sup> The United States was the EU's second largest export market.<sup>113</sup> In 2021, the United States had a trade deficit in agriculture with the EU for the 20<sup>th</sup> year in a row, amounting to 24 billion USD in 2021.<sup>114</sup> The United States imports predominantly wines and spirits, beer, chocolate, cheese, olive oil, as well as

<sup>107</sup> Bundesministerium für Ernährung und Landwirtschaft (BMEL), Agrarexporte verstehen, Fakten und Hintergründe, December 2018, [https://www.bmel.de/SharedDocs/Downloads/DE/Broschueren/Agrarexporte-verstehen.pdf?\\_\\_blob=publicationFile&v=9](https://www.bmel.de/SharedDocs/Downloads/DE/Broschueren/Agrarexporte-verstehen.pdf?__blob=publicationFile&v=9) (accessed July 28, 2023).

<sup>108</sup> Bundesministerium für Ernährung und Landwirtschaft, Außenhandel mit den USA, <https://www.bmel-statistik.de/aussenhandel/deutscher-aussenhandel/aussenhandel-mit-den-usa> (accessed June 28, 2023).

<sup>109</sup> Ibid.

<sup>110</sup> Ibid.

<sup>111</sup> Bundesministerium für Ernährung und Landwirtschaft (BMEL), Agrarexporte verstehen, Fakten und Hintergründe, 2018.

<sup>112</sup> International Trade Administration, EU – Country Commercial Guide, August 11, 2022, <https://www.trade.gov/country-commercial-guides/eu-agricultural-sector> (accessed June 7, 2023).

<sup>113</sup> European Commission, Agri-Food Trade Statistical Factsheet European Union – USA, April 18, 2023, [https://agriculture.ec.europa.eu/system/files/2023-05/agrifood-usa\\_en.pdf](https://agriculture.ec.europa.eu/system/files/2023-05/agrifood-usa_en.pdf) (accessed June 7, 2023).

<sup>114</sup> International Trade Administration, EU – Country Commercial Guide, 2022.

fruit and vegetable preparations from the EU.<sup>115</sup> Conversely, the United States exports mostly nuts, soybeans, animal feed, wheat, wines and spirits, and fruit, nuts, and spices to the EU market.<sup>116</sup>

sustainable and resilient agricultural systems that meet the demands of the present while ensuring future food security and environmental stewardship.

## In Conclusion

This comparison of agricultural landscapes in Germany and the United States reveals a complex tapestry of characteristics and trends that shape their respective farming sectors. Despite certain areas where the countries' agricultural sectors diverge, there are many common developments and mutual challenges. External pressures, such as climate change, population growth, and geopolitical events impacting trade have impelled policymakers to act and transformed farmers' livelihoods. Societal developments like urbanization have prompted other structural changes, as the sector confronts a declining labor force and difficulty attracting future generations. Consolidation of agricultural production has exerted pressure on small and family farms, shifting the agricultural landscape and transforming economic opportunity in rural regions. Farmers are faced with a dual, and to some extent conflicting, mandate to increase production while limiting use of natural resources. These are just some of the complex issues which confront the future of agriculture. With a more nuanced understanding of the similarities and differences between the agricultural sectors in the United States and Germany, policymakers, practitioners and other stakeholders can work towards

<sup>115</sup> European Commission, Agriculture and rural development United States, [https://agriculture.ec.europa.eu/international/agricultural-trade/bilateral-agreements/americas\\_en](https://agriculture.ec.europa.eu/international/agricultural-trade/bilateral-agreements/americas_en) (accessed July 28, 2023).

<sup>116</sup> Ibid.







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