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## **FARM STRUCTURES IN THE UNITED STATES OF AMERICA IN THE YEARS 1978-2017 – SELECTED ASPECTS<sup>1</sup>**

Key words: farm structures, the USA, average farm size

**ABSTRACT.** The aim of the study was an attempt to assess the level of changes in the agricultural farm structure of the United States of America within the years 1978-2017 in the he area. The main purpose of the study was to determine the share and dynamics in selected farm area groups in the process of farm area changes. The number of farms in the years 1978-2017 decreased from 2.29 million to 2.04 million (a decrease of 11%), while the area occupied by these farms decreased from 1,353 million acres to 900 million acres (down 33.5%) [USDA 2017]. The article puts forward the hypothesis that due to the long period of observation and regional diversity in agriculture – area changes in farms will confirm significant differences in the rate at which this phenomenon has occurred. The study shows the significant diversification of land resources, dynamics within the number of farms and land utilization within selected states. While the number of farms in the period under consideration increased in 17 states, it decreased in 33 states. The average area of farms in the case of 25 states increased, while it also decreased in 25 cases. The aggregated ratio of farm structure changes was characteristic of states where the most significant changes in farm structure occurred (Alaska, Arizona, Hawaii, New Mexico, North Carolina, Nevada and Massachusetts). Research confirmed relatively variable dynamics of farm area changes within a single country. Because of larger scale farms, in comparison to other countries (especially the EU region), the process of farm evolution seems to be slower and, in several cases, remains almost the same in terms of farm structure as 40 years ago. Farm area changes in the USA have shown significant spatial diversity.

### INTRODUCTION

According to the data of the United States Department of Agriculture (USDA), 89% of farms are small, with such farms operating on 52% of land in 2017. Large-scale family farms accounted for the largest share of production, at 39%. Family farms of various types together accounted for 98% of farms and 87% of production in 2017. Non-family farms constituted remaining farms (2%) and production (13%). In accordance with the most common farm typology developed by the USDA, farms are classified with regard to gross cash farm income (GCFI) [Burns, MacDonald 2018]. Beside such typology, agricultural farms were classified in terms of farm size: 1-9.99; 10-49.99; 50-69.99; 70-99.99;

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100-139.99; 140-179.99; 180-219.99; 220-259.99; 260-499.99; 500-999.99; 1,000-1,999.99; 2,000-4,999.99; 5,000 or more acres. Over the past several decades, there have been significant structural changes in the U.S. farm sector – with production shifting steadily to larger operations. Between 1982 and 2007, the midpoint farm size – the size at which half of all land is on bigger farms and half is on smaller farms – almost doubled from 589 to 1,105 acres [MacDonald et al. 2013]. Using a sales-based farm size measure, Christopher Burns and Ryan Kuhns [2016] showed that, over five years, about 42% of midsize farms transitioned into either small or large farms. Agricultural policy since the 70s and membership in the WTO [Smith et al. 2018] has had a significant impact on US farms.

## MATERIAL AND METHODS

The data on farm structure was collected on the basis of the “Census of agriculture” issued from 1978 till 2017 by the United States Department of Agriculture. Farm structure was described by: the number of farms, occupied farmland and average farm size in the United States of America and selected Member States.

In the paper, the comparison and description method was used [Kopeć 1983]. For the evaluation of farm structure changes, the synthetic 3 factor dynamics ratio was used (aggregated indicator of farm area changes) as an absolute value of changes in farm number, occupied area and average farm size. The following hypothesis has been put forward in the paper: in the area of the United States of America, in the investigated period of research, there were significant changes and significant differences in the rate of area changes in farms

## RESULTS

In 2017, 2,042,220 farms operated on 900,2 million acres. According to data for 2017, 69% of US farms were operated by full owners, 24% by part-owners and 7% by tenants, while 40% of US farmland was rented from others. Between 1997 and 2017, the number of farms declined by 8% and the amount of farmland declined by 6% [USDA 2017]. The number of farms in the United States in 1978 was over 2.28 million, while in 2017 2.04 million. In the period under consideration, the largest number of farms was in the area group of 10-50 acres and 260-500 acres (Table 1).

At the same time, the share of farms in total, in 1978, was highest in the area groups of 10-50 acres and 250-500 acres, respectively, 17.1% and 15.2% (Figure 1).

In the years 1978-2017, there was a significant loss of utilized agricultural area in the country (by 453.5 million acres). The largest amount of land at the beginning of the considered period was in the area group of 2,000-4,999 acre farms. At the end of the period under study, the largest area was dominated by the area group above 5,000 acres, which accounted for less than 342 million acres (Table 2). The largest farms maintained a similar amount of land throughout the entire investigated period. In the group of smallest farms, there was more than a twofold increase in land ownership. A similar tendency was recorded only in the area group of 50-69 acres.

Table 1. Number of farms, by size

| Farms by size [acres] | Number of farms  |                  |                  |                  |                  |
|-----------------------|------------------|------------------|------------------|------------------|------------------|
|                       | 1978             | 1987             | 1997             | 2007             | 2017             |
| 1 to 9                | 151,233          | 183,257          | 153,515          | 232,849          | 273,325          |
| 10 to 49              | 391,554          | 412,437          | 410,833          | 620,283          | 583,001          |
| 50 to 69              | 151,778          | 129,410          | 125,985          | 153,862          | 135,126          |
| 70 to 99              | 213,977          | 181,457          | 169,048          | 192,043          | 163,251          |
| 100 to 139            | 209,765          | 177,245          | 161,660          | 175,146          | 149,478          |
| 140 to 179            | 193,527          | 156,737          | 136,279          | 139,479          | 116,908          |
| 180 to 219            | 125,789          | 104,662          | 91,055           | 87,502           | 74,086           |
| 220 to 259            | 108,065          | 87,426           | 73,469           | 68,313           | 57,096           |
| 260 to 499            | 347,777          | 286,206          | 238,245          | 212,553          | 183,835          |
| 500 to 999            | 213,209          | 200,058          | 175,690          | 149,713          | 133,321          |
| 1,000 to 1,999        | 97,800           | 102,078          | 101,468          | 92,656           | 87,666           |
| 2,000 to 4,999        | 63,301           | 66,786           | 74,612           | 57,699           | 59,442           |
| 5,000 or more         | 19,611           | 19,349           | 20,402           | 22,694           | 25,685           |
| <b>Total</b>          | <b>2,287,386</b> | <b>2,107,108</b> | <b>1,932,261</b> | <b>2,204,792</b> | <b>2,042,220</b> |

Source: own elaboration based on USDA data [USDA1978-2017]

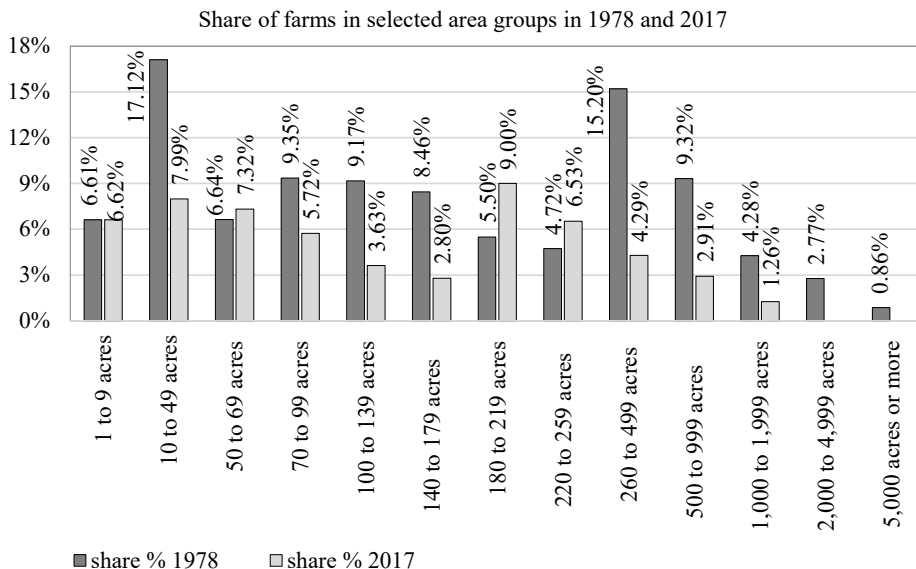


Figure 1. The share of farms in area groups

Source: own elaboration based on USDA data [USDA1978-2017]

Table 2. Land in farms, by size of farm

| Farms by size [acres] | Land in farms [acres] |               |               |             |             |
|-----------------------|-----------------------|---------------|---------------|-------------|-------------|
|                       | 1978                  | 1987          | 1997          | 2007        | 2017        |
| 1 to 9                | 554,891               | 673,676       | 649,057       | 1,080,019   | 1,302,208   |
| 10 to 49              | 10,948,637            | 11,060,844    | 10,964,237    | 15,918,542  | 14,787,940  |
| 50 to 69              | 8,257,019             | 7,525,783     | 7,318,098     | 8,930,361   | 7,845,508   |
| 70 to 99              | 17,608,127            | 14,935,081    | 13,912,939    | 15,783,304  | 13,414,191  |
| 100 to 139            | 24,445,359            | 20,630,762    | 18,778,397    | 20,313,722  | 17,343,842  |
| 140 to 179            | 30,529,586            | 24,702,448    | 21,459,734    | 21,954,090  | 18,399,918  |
| 180 to 219            | 24,869,432            | 20,697,122    | 17,998,364    | 17,283,570  | 14,645,228  |
| 220 to 259            | 25,707,629            | 20,806,626    | 17,483,499    | 16,258,454  | 13,586,644  |
| 260 to 499            | 124,642,460           | 102,916,730   | 85,444,119    | 75,892,077  | 65,775,717  |
| 500 to 999            | 146,697,837           | 138,540,671   | 122,093,219   | 104,140,461 | 92,872,530  |
| 1,000 to 1,999        | 133,085,648           | 138,809,554   | 138,793,018   | 127,595,277 | 120,680,141 |
| 2,000 to 4,999        | 467,430,609           | 463,171,328   | 476,900,574   | 170,612,215 | 177,602,657 |
| 5,000 or more         | 338,984,182           | 324,976,092   | 318,184,944   | 326,333,748 | 341,961,052 |
| Total                 | 1,353,761,416         | 1,289,446,717 | 1,249,980,199 | 922,095,840 | 900,217,576 |

Source: own elaboration based on USDA data [USDA1978-2017]

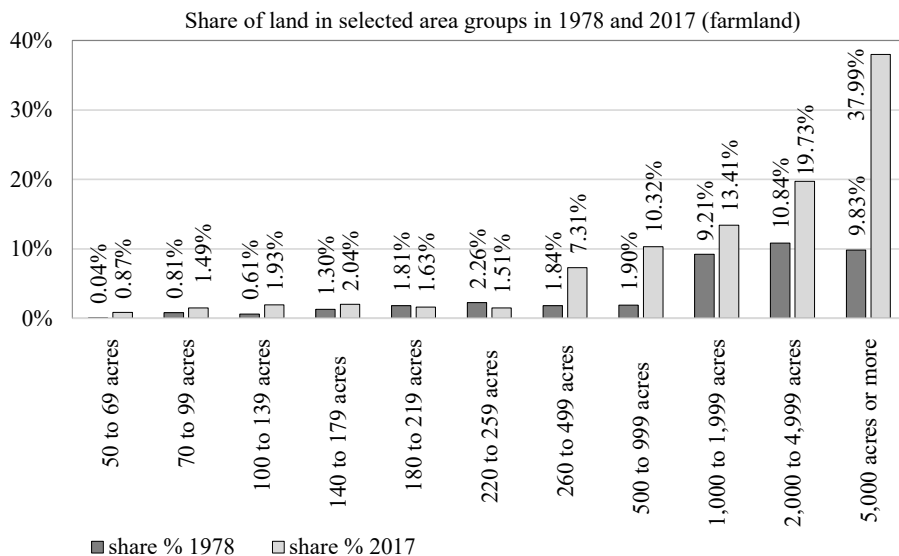


Figure 2. Share of farmland in area groups

Source: own elaboration based on USDA data [USDA1978-2017]

Table 3. Number of farms in the years 1978-2017 by state

| State          | Year    |         |         |         |         | Change<br>2017/1978 |
|----------------|---------|---------|---------|---------|---------|---------------------|
|                | 1978    | 1987    | 1997    | 2007    | 2017    |                     |
| Alabama        | 42,738  | 43,318  | 41,384  | 48,753  | 40,591  | -5.0                |
| Alaska         | 383     | 574     | 548     | 686     | 990     | 158.5               |
| Arizona        | 7,660   | 7,669   | 6,135   | 15,637  | 19,086  | 149.2               |
| Arkansas       | 58,766  | 48,242  | 45,142  | 49,349  | 42,625  | -27.5               |
| California     | 81,706  | 83,217  | 74,126  | 81,033  | 70,521  | -13.7               |
| Colorado       | 29,633  | 27,284  | 28,268  | 37,054  | 38,893  | 31.2                |
| Connecticut    | 4,560   | 3,580   | 3,687   | 5,006   | 5,521   | 21.1                |
| Delaware       | 3,632   | 2,966   | 2,460   | 2,546   | 2,302   | -36.6               |
| Florida        | 44,068  | 36,556  | 34,799  | 47,463  | 47,590  | 8.0                 |
| Georgia        | 58,648  | 43,552  | 40,334  | 47,846  | 42,439  | -27.6               |
| Hawaii         | 4,310   | 4,870   | 5,473   | 7,521   | 7,328   | 70.0                |
| Idaho          | 26,478  | 24,142  | 22,314  | 25,349  | 24,996  | -5.6                |
| Illinois       | 109,924 | 88,786  | 73,051  | 76,860  | 72,651  | -33.9               |
| Indiana        | 88,427  | 70,506  | 57,916  | 60,938  | 56,649  | -35.9               |
| Iowa           | 126,456 | 105,180 | 90,792  | 92,856  | 86,104  | -31.9               |
| Kansas         | 77,129  | 68,579  | 61,593  | 65,529  | 58,569  | -24.1               |
| Kentucky       | 109,980 | 92,453  | 82,273  | 85,260  | 75,966  | -30.9               |
| Louisiana      | 38,923  | 27,350  | 23,823  | 30,106  | 27,386  | -29.6               |
| Maine          | 8,158   | 6,269   | 5,810   | 8,136   | 7,600   | -6.8                |
| Maryland       | 18,727  | 14,776  | 12,084  | 12,834  | 12,429  | -33.6               |
| Massachusetts  | 5,891   | 6,216   | 5,574   | 7,691   | 7,241   | 22.9                |
| Michigan       | 68,237  | 51,172  | 46,027  | 56,014  | 47,641  | -30.2               |
| Minnesota      | 102,963 | 85,079  | 73,367  | 80,992  | 68,822  | -33.2               |
| Mississippi    | 54,182  | 34,074  | 31,318  | 41,959  | 34,988  | -35.4               |
| Missouri       | 121,955 | 106,105 | 98,860  | 107,825 | 95,320  | -21.8               |
| Montana        | 24,469  | 24,568  | 24,279  | 29,524  | 27,048  | 10.5                |
| Nebraska       | 65,916  | 60,502  | 51,454  | 47,712  | 46,332  | -29.7               |
| Nevada         | 2,877   | 3027    | 2829    | 3131    | 3,423   | 19.0                |
| New Hampshire  | 3,288   | 2,515   | 2,937   | 4,166   | 4,123   | 25.4                |
| New Jersey     | 9,895   | 9,032   | 9,101   | 10,27   | 9,883   | -0.1                |
| New Mexico     | 14,253  | 14,249  | 14,094  | 20,930  | 25,044  | 75.7                |
| New York       | 49,273  | 37,743  | 31,757  | 36,352  | 33,438  | -32.1               |
| North Carolina | 89,367  | 59,284  | 49,406  | 52,913  | 46,418  | -48.1               |
| North Dakota   | 41,169  | 35,289  | 30,504  | 31,970  | 26,364  | -36.0               |
| Ohio           | 95,937  | 79,277  | 68,591  | 75,861  | 77,805  | -18.9               |
| Oklahoma       | 79,388  | 70,228  | 74214   | 86,565  | 78,531  | -1.1                |
| Oregon         | 34,642  | 32,014  | 34,030  | 38,553  | 37,616  | 8.6                 |
| Pennsylvania   | 59,942  | 51,549  | 45,457  | 63,163  | 53,157  | -11.3               |
| Rhode Island   | 866     | 701     | 735     | 1,219   | 1,043   | 20.4                |
| South Carolina | 33,430  | 20,517  | 20,189  | 25,867  | 24,791  | -25.8               |
| South Dakota   | 39,665  | 36,376  | 31,284  | 31,260  | 29,968  | -24.4               |
| Tennessee      | 97,036  | 79,711  | 76,818  | 79,280  | 69,983  | -27.9               |
| Texas          | 194,253 | 188,788 | 194,301 | 247,437 | 248,416 | 27.9                |
| Utah           | 13,833  | 14,066  | 14,181  | 16,700  | 18,409  | 33.1                |
| Vermont        | 7,273   | 5,877   | 5,729   | 6,984   | 6,808   | -6.4                |
| Virginia       | 56,869  | 44,799  | 41,095  | 47,383  | 43,225  | -24.0               |
| Washington     | 37,730  | 33,559  | 29,011  | 39,284  | 35,793  | -5.1                |
| West Virginia  | 20,532  | 17,237  | 17,772  | 23,618  | 23,622  | 15.0                |
| Wisconsin      | 89,945  | 75,131  | 65,502  | 78,463  | 64,793  | -28.0               |
| Wyoming        | 8,495   | 9,205   | 9,232   | 11,070  | 11,938  | 40.5                |

Source: own elaboration based on USDA data [USDA1978-2017]

Changes in the share of agricultural land ownership, in the period under consideration, in the area groups of up to 259 acres, were not significant. These farms accounted for just over 9.5%. Significant changes in the share of farms were recorded in the 260 acres area group. Farms with an area of over 2,000 acres operated on over 57% of utilized agricultural area (Figure 2).

In the list of farms by state, the largest number in 1978 was recorded in the states of Texas, Iowa, Missouri, Kentucky, Illinois, Minnesota, and Tennessee (over 100,000). In 2017, however, the order of states changed as follows: Texas, Missouri, Iowa, Oklahoma, Ohio, Kentucky and Illinois (Table 3). The largest decrease (over 35%), in the number of farms, occurred in the states of North Carolina, Delaware, North Dakota, Indiana, Mississippi. On the other hand, the largest increase in number was observed in the states of: Alaska, Arizona, New Mexico, Hawaii, Wyoming and Utah. In four states: New Jersey, Oklahoma, Alabama and Washington, the situation was stable within the whole period of research.

In 1978, Texas, Montana, New Mexico, Kansas, Nebraska, South Dakota, and North Dakota had the largest resources in terms of land utilization in individual states. Of least significance here, on the other hand, were: Rhode Island, Connecticut, New Hampshire, Massachusetts, Delaware and New Jersey. A similar situation was recorded in 2017, when the states with the largest land resources were: Texas, Montana, Kansas, Nebraska, South Dakota and New Mexico. The greatest dynamics of the loss of agricultural land resources was recorded in the following states: Hawaii, Nevada, New Jersey, Massachusetts, Alaska, Connecticut and Arizona. The smallest loss of land surface area (below 5.5%) was observed in the states of: Utah, Oklahoma, Nebraska, South Dakota, Kansas and West Virginia (Table 4).

The scientific studies on area transformations to date most often refer to changes in the number of farms and the area occupied by them and are described by these two indicators. The largest average farm area in 1978 was recorded for the following states: Arizona, Wyoming, Nevada, New Mexico, Alaska and Montana (over 2500 acres) (Table 5). The smallest area of farms were recorded in the following states: Rhode Island, New Jersey, Connecticut, Massachusetts and North Carolina. The average area of the largest farms in 2017 decreased. Despite this phenomenon, the largest average farms were recorded in: Wyoming, Montana, Nevada, New Mexico, North Dakota and South Dakota. The largest decrease in average farm area was recorded in the states of: Alaska, Arizona, Hawaii, New Mexico, and Nevada and the highest increase (over 37%) in: North Dakota, North Carolina, Nebraska, Illinois and Indiana.

The aggregate area transformation indicator assumed the highest value in the following states: Alaska, Arizona, Hawaii, New Mexico, North Carolina, Nevada and Massachusetts (over 107%). In these states, the most significant changes occurred in the farm area structure. Based on the above indicator, it can be concluded that in 7 states there were slight changes in area structure, taking into account long-term process, and these were: Oklahoma, Washington, Montana, Pennsylvania, Maine, West Virginia and Ohio.

In the overall specification (Figures 3A and 3B), the number of farms in the period under consideration increased in 17 and decreased in 33 states. A slight increase in Utilized Agricultural Area (2.8%) was only recorded in the state of Utah. The situation of changes

Table 4. Farmland in the years 1978-2017 by state

| State          | Land in farms [acres] |             |            |             |             | Change<br>2017/1978 |
|----------------|-----------------------|-------------|------------|-------------|-------------|---------------------|
|                | 1978                  | 1987        | 1997       | 2007        | 2017        |                     |
| Alabama        | 11,547,717            | 9,142,753   | 8,704,385  | 9,033,537   | 8,580,940   | -25.7               |
| Alaska         | 1,286,463             | 1,008,162   | 881,045    | 881,585     | 849,753     | -33.9               |
| Arizona        | 38,657,700            | 36,288,794  | 26,866,722 | 26,118,899  | 26,125,819  | -32.4               |
| Arkansas       | 15,577,474            | 14,355,611  | 14,364,955 | 13,872,862  | 13,888,929  | -10.8               |
| California     | 33,130,362            | 30,598,178  | 27,698,779 | 25,364,695  | 24,522,801  | -26.0               |
| Colorado       | 35,470,404            | 34,048,433  | 32,634,221 | 31,604,911  | 31,820,957  | -10.3               |
| Connecticut    | 500,369               | 398,400     | 359,313    | 362,867     | 334,209     | -33.2               |
| Delaware       | 679,045               | 272,574     | 579,545    | 362,090     | 525,324     | -22.6               |
| Florida        | 13,306,231            | 11,194,090  | 10,454,217 | 9,231,570   | 9,731,731   | -26.9               |
| Georgia        | 13,742,485            | 10,744,718  | 10,671,246 | 10,150,539  | 9,953,730   | -27.6               |
| Hawaii         | 1,988,282             | 1,721,521   | 1,430,308  | 1,121,329   | 1,135,352   | -42.9               |
| Idaho          | 14,869,911            | 13,931,875  | 11,830,167 | 11,497,383  | 11,691,912  | -21.4               |
| Illinois       | 29,730,739            | 28,526,664  | 27,204,780 | 26,775,100  | 27,006,288  | -9.2                |
| Indiana        | 17,037,075            | 16,170,895  | 15,111,022 | 14,773,184  | 14,969,996  | -12.1               |
| Iowa           | 33,580,851            | 3,163,8130  | 31,166,699 | 30,747,550  | 30,563,878  | -9.0                |
| Kansas         | 47,747,446            | 46,628,519  | 46,089,268 | 46,345,827  | 45,759,319  | -4.2                |
| Kentucky       | 15,040,398            | 14,012,700  | 13,334,234 | 1,399,3121  | 12,961,784  | -13.8               |
| Louisiana      | 9,604,986             | 8,007,173   | 7,876,528  | 8,109,975   | 7,997,511   | -16.7               |
| Maine          | 1,606,239             | 1,342,588   | 1,211,648  | 1347,566    | 1,307,613   | -18.6               |
| Maryland       | 2,713,578             | 2,396,629   | 2,154,875  | 2,051,757   | 1,990,122   | -26.7               |
| Massachusetts  | 678,714               | 615,185     | 464,147    | 503,171     | 431,646     | -36.4               |
| Michigan       | 11,448,182            | 10,316,861  | 9,872,812  | 14,988,997  | 9,764,090   | -14.7               |
| Minnesota      | 28,678,829            | 26,573,819  | 25,994,621 | 26,917,507  | 2,5516,982  | -11.0               |
| Mississippi    | 13,864,787            | 10,746,190  | 10,124,822 | 11,456,241  | 10,415,136  | -24.9               |
| Missouri       | 30,848,898            | 29,209,187  | 28,826,188 | 29,026,573  | 27,781,883  | -9.9                |
| Montana        | 62,269,824            | 60,203,993  | 58,607,778 | 61,388,462  | 58,122,878  | -6.7                |
| Nebraska       | 46,273,401            | 45,305,441  | 45,525,414 | 45,480,358  | 44,986,821  | -2.8                |
| Nevada         | 10,474,965            | 9,988,520   | 6,409,288  | 5,865,392   | 6,128,153   | -41.5               |
| New Hampshire  | 540,807               | 384,607     | 415,031    | 430,852     | 387,106     | -28.4               |
| New Jersey     | 1,049,435             | 894,426     | 832,600    | 733,460     | 658,676     | -37.2               |
| New Mexico     | 48,301,326            | 46,018,005  | 45,787,108 | 43,238,049  | 40,659,836  | -15.8               |
| New York       | 9,906,906             | 8,416,228   | 7,254,470  | 7,174,743   | 6,866,171   | -30.7               |
| North Carolina | 11,352,783            | 944,7705    | 9,122,379  | 8,474,671   | 8,430,522   | -25.7               |
| North Dakota   | 42,025,363            | 40,336,869  | 39,359,346 | 3,9674,586  | 39,341,591  | -6.4                |
| Ohio           | 16,090,902            | 14,997,381  | 14,103,085 | 1,3956,563  | 13,965,295  | -13.2               |
| Oklahoma       | 34,344,480            | 31,541,977  | 33,218,677 | 35,087,269  | 34,156,290  | -0.5                |
| Oregon         | 18,414,484            | 17,809,165  | 17449293   | 16,399,647  | 15,962,322  | -13.3               |
| Pennsylvania   | 8,747,279             | 7,866,289   | 7167906    | 7,809,244   | 7,278,668   | -16.8               |
| Rhode Island   | 68,298                | 48,639      | 47144      | 62,037      | 47,161      | -30.9               |
| South Carolina | 6,318,617             | 4,758,631   | 4,238,848  | 4,889,339   | 4,744,913   | -24.9               |
| South Dakota   | 44,543,394            | 44,147,503  | 44,354,880 | 43,666,403  | 43,243,742  | -2.9                |
| Tennessee      | 13,150,498            | 11,731,386  | 11,122,363 | 11,023,834  | 10,874,238  | -17.3               |
| Texas          | 137,547,468           | 130,502,792 | 131308286  | 130,398,753 | 127,036,184 | -7.6                |
| Utah           | 10,17,668             | 9,989,073   | 12,024,661 | 11,094,700  | 10,811,604  | 2.8                 |
| Vermont        | 1,752,940             | 1,407,868   | 1,262,155  | 1,146,786   | 1,193,437   | -31.9               |
| Virginia       | 9,965,481             | 8,676,336   | 8,228,226  | 8,103,934   | 7,797,979   | -21.8               |
| Washington     | 17,002,288            | 16,115,568  | 15,179,710 | 14,972,789  | 14,679,857  | -13.7               |
| West Virginia  | 3,867,996             | 3,372,955   | 3,455,532  | 3,501,435   | 3,662,178   | -5.3                |
| Wisconsin      | 18,106,245            | 16,606,567  | 14,900,205 | 15,190,804  | 14,318,630  | -20.9               |
| Wyoming        | 33,718,235            | 33,595,135  | 34,088,692 | 30,169,526  | 29,004,884  | -14.0               |

Source: own elaboration based on USDA data [USDA1978-2017]



Table 5. Average farm size in the years 1978-2017 by state

| State          | Average farm size [acres] |       |       |       |       | Change | Aggregated ratio of farm structure changes |
|----------------|---------------------------|-------|-------|-------|-------|--------|--------------------------------------------|
|                | 1978                      | 1987  | 1997  | 2007  | 2017  |        |                                            |
| Alabama        | 270                       | 211   | 210   | 185   | 211   | -21.8  | 52.5                                       |
| Alaska         | 3,359                     | 1,756 | 1,608 | 1,285 | 858   | -74.4  | 266.9                                      |
| Arizona        | 5,047                     | 4,732 | 4,379 | 1,670 | 1,369 | -72.9  | 254.5                                      |
| Arkansas       | 265                       | 298   | 318   | 281   | 326   | 22.9   | 61.2                                       |
| California     | 405                       | 368   | 374   | 313   | 348   | -14.2  | 53.9                                       |
| Colorado       | 1,197                     | 1,248 | 1,154 | 853   | 818   | -31.6  | 73.2                                       |
| Connecticut    | 110                       | 111   | 97    | 72    | 61    | -44.8  | 99.1                                       |
| Delaware       | 187                       | 92    | 236   | 142   | 228   | 22.1   | 81.3                                       |
| Florida        | 302                       | 306   | 300   | 195   | 204   | -32.3  | 67.1                                       |
| Georgia        | 234                       | 247   | 265   | 212   | 235   | 0.1    | 55.3                                       |
| Hawaii         | 461                       | 353   | 261   | 149   | 155   | -66.4  | 179.3                                      |
| Idaho          | 562                       | 577   | 530   | 454   | 468   | -16.7  | 43.7                                       |
| Illinois       | 270                       | 321   | 372   | 348   | 372   | 37.4   | 80.5                                       |
| Indiana        | 193                       | 229   | 261   | 242   | 264   | 37.2   | 85.2                                       |
| Iowa           | 266                       | 301   | 343   | 331   | 355   | 33.7   | 74.6                                       |
| Kansas         | 619                       | 680   | 748   | 707   | 781   | 26.2   | 54.4                                       |
| Kentucky       | 137                       | 152   | 162   | 164   | 171   | 24.8   | 69.5                                       |
| Louisiana      | 247                       | 293   | 331   | 269   | 292   | 18.3   | 64.7                                       |
| Maine          | 197                       | 214   | 209   | 166   | 172   | -12.6  | 38.0                                       |
| Maryland       | 145                       | 162   | 178   | 160   | 160   | 10.5   | 70.8                                       |
| Massachusetts  | 115                       | 99    | 83    | 65    | 60    | -48.3  | 107.6                                      |
| Michigan       | 168                       | 202   | 215   | 268   | 205   | 22.2   | 67.1                                       |
| Minnesota      | 279                       | 312   | 354   | 332   | 371   | 33.1   | 77.3                                       |
| Mississippi    | 256                       | 315   | 323   | 273   | 298   | 16.3   | 76.6                                       |
| Missouri       | 253                       | 275   | 292   | 269   | 291   | 15.2   | 47.0                                       |
| Montana        | 2,545                     | 2,451 | 2,414 | 2,079 | 2,149 | -15.6  | 32.8                                       |
| Nebraska       | 702                       | 749   | 885   | 953   | 971   | 38.3   | 70.8                                       |
| Nevada         | 3,641                     | 3,300 | 2,266 | 1,873 | 1,790 | -50.8  | 111.3                                      |
| New Hampshire  | 164                       | 153   | 141   | 103   | 94    | -42.9  | 96.7                                       |
| New Jersey     | 106                       | 99    | 91    | 71    | 67    | -37.2  | 74.5                                       |
| New Mexico     | 3,389                     | 3,230 | 2,249 | 2,066 | 1,624 | -52.1  | 143.6                                      |
| New York       | 201                       | 223   | 228   | 197   | 205   | 2.1    | 65.0                                       |
| North Carolina | 127                       | 159   | 185   | 160   | 182   | 43.0   | 116.8                                      |
| North Dakota   | 1,021                     | 1,143 | 1,290 | 1,241 | 1,492 | 46.2   | 88.5                                       |
| Ohio           | 168                       | 189   | 206   | 184   | 179   | 7.0    | 39.1                                       |
| Oklahoma       | 433                       | 449   | 448   | 405   | 435   | 0.5    | 2.2                                        |
| Oregon         | 532                       | 556   | 513   | 425   | 424   | -20.2  | 42.1                                       |
| Pennsylvania   | 146                       | 153   | 158   | 124   | 137   | -6.2   | 34.3                                       |
| Rhode Island   | 79                        | 69    | 64    | 51    | 45    | -42.7  | 94.1                                       |
| South Carolina | 189                       | 232   | 210   | 189   | 191   | 1.3    | 52.0                                       |
| South Dakota   | 1,123                     | 1,214 | 1,418 | 1,397 | 1,443 | 28.5   | 55.9                                       |
| Tennessee      | 136                       | 147   | 145   | 139   | 155   | 14.7   | 59.8                                       |
| Texas          | 708                       | 691   | 676   | 527   | 511   | -27.8  | 63.3                                       |
| Utah           | 760                       | 710   | 848   | 664   | 587   | -22.8  | 58.6                                       |
| Vermont        | 241                       | 240   | 220   | 164   | 175   | -27.3  | 65.6                                       |
| Virginia       | 175                       | 194   | 200   | 171   | 180   | 2.9    | 48.7                                       |
| Washington     | 451                       | 480   | 523   | 381   | 410   | -9.0   | 27.8                                       |
| West Virginia  | 188                       | 196   | 194   | 148   | 155   | -17.7  | 38.1                                       |
| Wisconsin      | 201                       | 221   | 227   | 194   | 221   | 9.8    | 58.7                                       |
| Wyoming        | 3,969                     | 3,650 | 3,692 | 2,725 | 2,430 | -38.8  | 93.3                                       |

Source: own elaboration based on USDA data [USDA1978-2017]

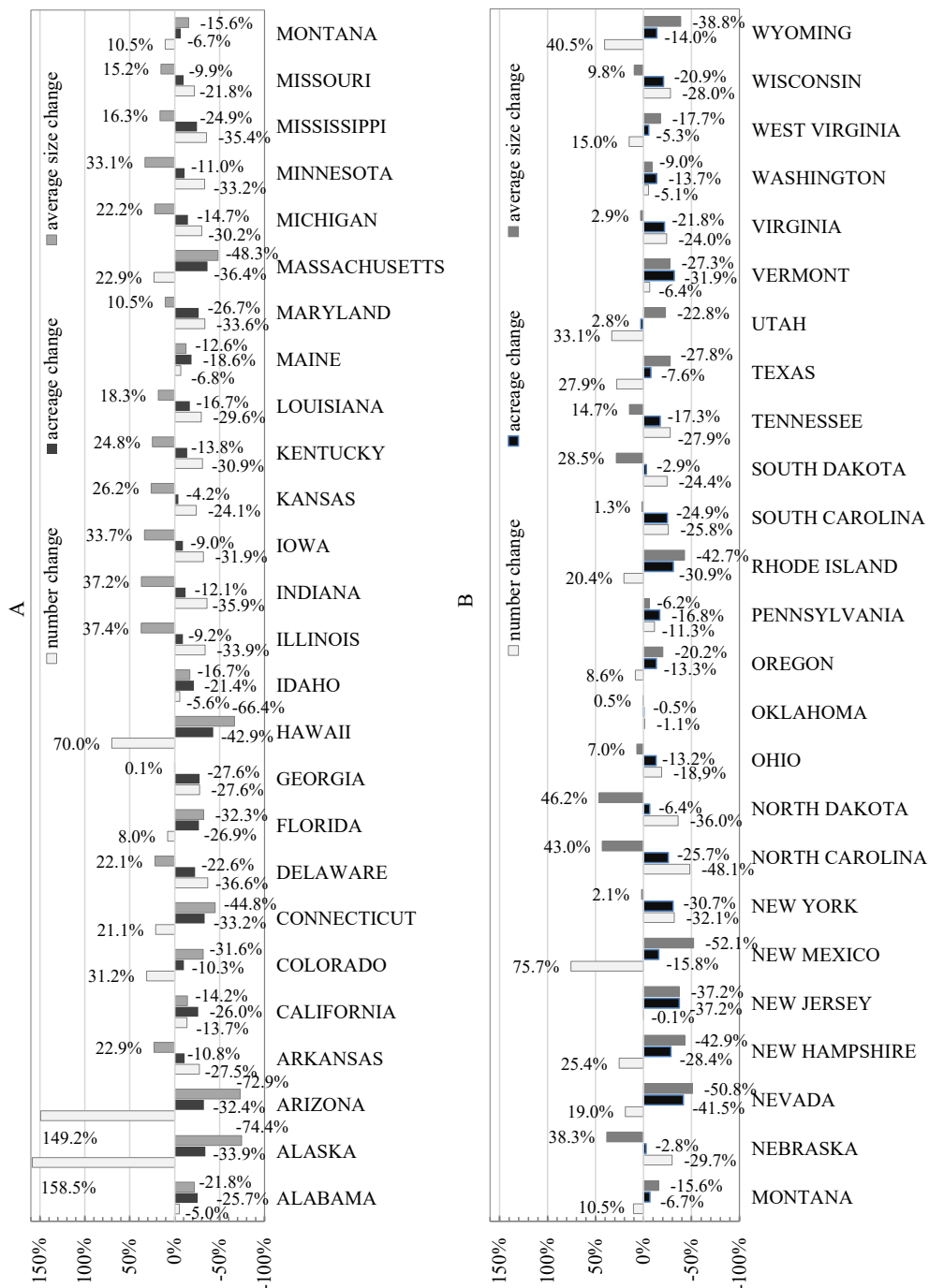


Figure 3A and B. Changes in farm structure and average farm size in the years 1978-2017  
 Source: own elaboration based on USDA data [USDA1978-2017]

in the average area of farms appears to be most interesting. In the case of 25 states (50% of the population), this area increased but also decreased in 25 states. The aggregated ratio of farm structure changes allowed to identify the states where the most significant changes occurred in this respect. These states include: Alaska, Arizona, Hawaii, New Mexico, North Carolina, Nevada and Massachusetts (value of ratio over 100%).

## CONCLUSIONS

American agriculture has shown great spatial diversity in recent decades. Contrary to EU trends, the average farm surface area has decreased. The number of farms in the years 1978-2017 decreased from 2.29 million to 2.04 million (a decrease of 11%), while the area occupied by these farms decreased from 1.353 million acres to 900 million acres (down 33.5%). At the same time, average farm size decreased from 591 to 440 acres. The share of farms by number decreased most significantly in area groups above 260 acres, while their share in utilized agricultural area increased most significantly. The aggregated indicator of area changes in farms allowed to identify the states where the dynamics of changes was the highest: Alaska, Arizona, Hawaii, New Mexico, North Carolina, Nevada and Massachusetts. A very low rate of area change was recorded in the following states: Oklahoma, Washington, Montana, Pennsylvania, Maine, West Virginia and Ohio (value of aggregated ratio of area changes)

There are, however, noticeable land concentration processes in larger units (over 260 acres). An aggregated indicator of changes in the area structure of agricultural farms has been applied in the study. Thanks to the application of the aggregated indicator of area transformations, apart from changes in the number of farms and the area they occupy, changes in average farm area were also included in the study. The value of the index does not inform whether the changes were beneficial or not, although it indicates areas (States) in which they occurred with greatest intensity. From the point of view of sustainable development principles, area transformations taking place in agricultural farms may be interpreted differently. There is, therefore, a need to propose an assessment of the economic, social and environmental justification of area-based transformations that have positive effects in these areas. Undoubtedly, the research hypothesis put forward in the paper has been confirmed. It states that due to a long period of observation and regional diversity in agriculture – area changes in farms will confirm significant differences in the rate at which this phenomenon has occurred.

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## STRUKTURA OBSZAROWA GOSPODARSTW ROLNYCH W STANACH ZJEDNOCZONYCH AMERYKI PÓŁNOCNEJ W LATACH 1978-2017 – WYBRANE ASPEKTY

Słowa kluczowe: struktura obszarowa, Stany Zjednoczone Ameryki Północnej,  
średnia powierzchnia gospodarstwa

### ABSTRAKT

Celem pracy jest ocena poziomu przemian struktury obszarowej gospodarstw rolnych w latach 1978-2017 na terenie Stanów Zjednoczonych Ameryki. Skupiono się na określeniu zmian w liczbie gospodarstw, zajmowanej powierzchni oraz ich średniej wielkości. Liczba gospodarstw w latach 1978-2017 zmniejszyła się z 2,29 mln do 2,04 mln (spadek o 11%), natomiast powierzchnia zajmowana przez te gospodarstwa zmniejszyła się z 1353 mln akrów do 900 mln akrów (spadek o 33,5%). Badania potwierdziły znaczne zróżnicowanie w zasobie gruntów rolnych, dynamikę w zakresie liczby i zmian w powierzchni w wybranych stanach. Liczba gospodarstw w badanym okresie wzrosła w 17 stanach, a zmniejszyła się w 33. Średnia powierzchnia gospodarstw w przypadku 25 stanów wzrosła, natomiast zmniejszyła się również w 25 przypadkach. Zagregowany wskaźnik zmian struktury obszarowej (zagregowana wartość bezwzględna dynamiki zmian liczby, zajmowanej powierzchni oraz średniej powierzchni gospodarstwa w badanym okresie) zidentyfikował stany, w których wystąpiły najbardziej znaczące zmiany w strukturze obszarowej gospodarstw i były to: Alaska, Arizona, Hawaje, Nowy Meksyk, Karolina Północna, Nevada i Massachusetts. Potwierdzono przestrzenne zróżnicowanie przemian obszarowych gospodarstw rolnych na terenie jednego kraju. Ze względu na większą skalę koncentracji zasobów ziemi w gospodarstwach w porównaniu z innymi krajami (zwłaszcza regionem UE), proces ewolucji gospodarstw wydaje się być wolniejszy i utrzymuje w kilku przypadkach prawie niezmienną strukturę, podobnie jak przed 40 laty. Przemiany obszarowe gospodarstw rolnych na terenie USA wykazały istotne przestrzenne zróżnicowanie.

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