# The Effectiveness of Developing Branches of the Agricultural Sector in Peasant (Farm) Enterprises



Svetlana S. Sushentsova<sup>(D)</sup>, Tatyana A. Bayer<sup>(D)</sup>, and Nina I. Litvina

**Abstract** The role of the farming sector in the production of agricultural products and food saw a gradual and steady increase in the modern development of the agricultural economy. According to the All-Russian Agricultural Census 2016, the number of peasant (farm) enterprises and individual entrepreneurs [P(F)E] amounted to174.6 thousand, while the area of land in their use amounted to 42 million hectares [4]. In 2003–2016, the volume of manufactured products increased 13.4 times, while its share among all agricultural products increased from 4.9% in 2003 to 12.5% in 2016. The share of farm products in total grain production in 2017 amounted to 29.1%, sugar beet—11.6%, and sunflower—31.5%. The production volume of these products increased by 3-4 times compared to 2003. However, as practice shows, a large volume of production does not always act as the primary condition for farm activity effectiveness. Thus, the authors tried to analyze the system of indicators characterizing the production efficiency of the main types of agricultural products in the P(F)E under economic conditions of a particular Russian region. During the study, the authors used analytical methods, statistical analysis, and expert assessment. The research structure includes several stages. The initial stage aims to identify the most demanded agricultural branches among farmers. The research proceeds to evaluate the efficiency of the production of the corresponding products. It analyzes the effective use of the primary production resources of P(F)Es within this combination of branches and assesses the financial and economic activities of P(F)Es. Except for a few regions, Russian P(F)Es specialize in crop production [13, 14]. The profitability of farms still needs to be increased even if the production resources are used efficiently. This development proves the high dependence of modern P(F)Es on the external economic conditions of their existence (the possibility of lending, sales of products, and relations with the state).

N. I. Litvina

Russian State Agrarian Correspondence University, Balashikha, Russia

S. S. Sushentsova (🖂) · T. A. Bayer

Federal Research Center of Agrarian Economy and Social Development of Rural Areas-All Russian Research Institute of Agricultural Economics, Moscow, Russia

<sup>©</sup> The Author(s), under exclusive license to Springer Nature Switzerland AG 2021 A. V. Bogoviz (ed.), *The Challenge of Sustainability in Agricultural Systems*, Lecture Notes in Networks and Systems 206, https://doi.org/10.1007/978-3-030-72110-7\_7

**Keywords** Peasant (farm) enterprises · Efficiency · Crop production · Animal husbandry · Agriculture · Branch · Agricultural production · Production resources · Profitability · Expenses

## **1** Introduction

Legislatively and essentially, modern Russian P(F)Es belong to a set of business structures marked with independence in making economic decisions and the desire to realize the entrepreneurial spirit of their owners aiming to obtain higher income from their activities over many years. The features of this farming form presuppose the ability of its business executive to correlate the viability of chosen branches, the innovative elements, the territorial and bioclimatic conditions of the location of the P(F)E, the situation on local, regional, and global markets, as well as other factors affecting the achievement of the goal in correct proportions [10].

During the formation of peasant (farm) enterprises in Russia (the beginning of the 1990s), their organization had a spontaneous nature. They were established without any serious studies of future activities and did not factor in the availability of labor and financial resources [8]. Creating equal economic conditions for various forms of ownership in agriculture has increased the access of farmers to land as the primary means of production [6, 7]. However, their allocation was carried out by agricultural organizations, which, as a rule, allocated the worst land in terms of fertility (idle or inarable land) to P(F)Es. This land was usually located far from all available means of communication. A questionnaire survey of farmers who organized their farms before 1998 showed that 38.2% of owners of peasant (farmer) enterprises rated their "first" land as the worst, while 61.8% described it as average. Not a single participant in the survey rated their land as the best.

Within the transition to market relations, the structure of production was determined by economic entities (including farmers) exclusively factoring in the market conditions of products and the effectiveness of their sales. For example, in farms located in the raw material zones of processing enterprises, a significant share in the structure of crops was occupied by industrial crops, the processing of which on tolling terms made it possible to obtain guaranteed sales markets.

It is possible to assess the justification of this one-factor approach to the organization of economic activities using a system of performance indicators. The concept of efficiency implies the ratio of the result to the cost of funds or resources spent on its achievement, while the dynamics of the values of these indicators will reveal the degree of improvement or deterioration of resources [9].

Currently, the country changed the economic conditions, meaning, and functions, as well as the internal structure and quality of the farming sector. The efficiency of economic activities of P(F)E requires an assessment and search for solutions to an immense set of problems. These problems arise in connection with the internal reform of the AIC and the global interests of the state to ensure food security through import substitution mechanisms.

The study analyzes the efficiency of farm production branches to identify on-farm reserves to increase the overall efficiency of the financial and economic activities of P(F)Es.

### 2 Materials and Methods

The research applies unified methodological schemes, methods, and standards developed for agricultural producers. The paper indicates (where possible) the main features of peasant (farm) enterprises, a wide variety of their standard sizes, and the specifics of the agricultural production conditions by region.

The paper applies methods of economic and statistical evaluation of the time series of dynamics for 5-20 years for particular performance indicators. The authors conducted questionnaire surveys of farmers and delegates of AKKOR to identify the attitude of P(F)E owners regarding various stages of development of their business [1]. The paper is based on the selective use of literary and analytical generalization, expert evaluation, monographic experience, etc.

During this research, we used such information resources as scientific and reference literature, data of the Russian Federal State Statistics Service (including the results of the All-Russian Agricultural Census 2006 and 2016), regional consolidated annual accounting reports of P(F)Es and their cooperatives, monographic research of the scholars. The extensive scientific and analytical material collected during the study allowed us to conduct a qualitative and objective analysis of the effectiveness of agricultural branches in peasant (farm) enterprises.

### **3** Results

In Russia, peasant (farm) enterprises specialize in crop production, as evidenced by the sectoral structure of agricultural production (Table 1). Moreover, the share of livestock production varies from 43.3% in 1998 (the maximum value for the study period) to 20.3% in 2018 (the minimum value), never exceeding the 50% threshold.

The concealed nature of collecting and processing statistical information on the financial and economic activities of peasant (farm) enterprises in Russia makes it impossible to conduct adequate monitoring of the development of the entirety of P(F)Es within the country. A change in the overall situation would increase the ability of management bodies and scientific institutions to develop more informed decisions on determining the levers and directions for improving the efficiency of farm production. We selected one of the Russian regions marked with basic indicator values of the farm sector development, close to the national average. For example, the share of crop production obtained by farmers of the Tula Region in 2018 amounted to 88.1%, while their share of livestock production amounted to 11.9%.

| Year               | Units of measurement | Agriculture | Horticulture | Animal husbandry |
|--------------------|----------------------|-------------|--------------|------------------|
| 1998               | Billion rubles       | 6.7         | 3.8          | 2.9              |
|                    | %                    | 100         | 56.7         | 43.3             |
| 2002               | Billion rubles       | 38.3        | 27.9         | 10.4             |
|                    | %                    | 100         | 72.8         | 27.2             |
| 2007               | Billion rubles       | 147.6       | 116.8        | 30.8             |
|                    | %                    | 100         | 79.1         | 20.9             |
| 2012               | Billion rubles       | 281.2       | 208.6        | 72.6             |
|                    | %                    | 100         | 74.2         | 25.8             |
| 2017               | Billion rubles       | 635.6       | 499.2        | 136.4            |
|                    | %                    | 100         | 78.5         | 21.5             |
| 2018               | Billion rubles       | 670.0       | 530.2        | 139.8            |
|                    | %                    | 100         | 79.1         | 20.9             |
| Changes in 2018 to |                      |             |              |                  |
| 1998               | By a factor of       | 100.0       | 139.5        | 48.2             |
|                    | рр                   | -           | 22.4         | -22.4            |
| 2017               | %                    | 105.4       | 106.2        | 102.5            |
|                    | pp                   | -           | 0.6          | -0.6             |

Table 1 Sectoral structure of agricultural production in the P(F)Es of the Russian Federation, %

Source Developed by the authors based on [5]

A more detailed analysis of the specialization indicators of studied region showed that P(F)Es prefer growing grain and potatoes, which accounted for 57.9% and 20.1%, respectively, in the structure of sales revenue for 2018 (Table 2).

The methodology for evaluating the production efficiency is based on the natural values of the gross production of a specific product correlated to the primary production source of its manufacture. The de facto harvested sown areas act as the primary source of crop production, while livestock fulfills this role in animal husbandry. The analysis of crop yields and animal productivity showed consistent growth, except the average daily increase in the live weight of cattle (Table 3).

Primary production resources include land, labor, and fixed assets. The land-use efficiency in peasant (farm) enterprises of the Tula Region is generally increasing. This is indicated by the annual increase in the cost of gross agricultural production per unit of land area, which amounted to 48.1% during the study period (Table 4). This result was achieved due to the intensification of farm production and an increase in the area of farmland used by the owners of P(F)Es (6.7% per year).

The cost of fixed assets grew by 9.7% annually, while the return on assets increased by 64.4%. The annual productivity of labor in P(F)Es also outpaced the number of their employees, while the size of the increase in wages indicates an increase in their skill level.

| Production      | Year            |      |                 |      |                 |      |                 |      |
|-----------------|-----------------|------|-----------------|------|-----------------|------|-----------------|------|
| type            | 2011            |      | 2014            |      | 2017            | 2017 |                 |      |
|                 | Thousand rubles | %    |
| Grain           | 19,986.0        | 25.5 | 53,824.3        | 47.5 | 1,812,396.2     | 42.8 | 2,944,373       | 57.9 |
| Rapeseed        | 1591.2          | 2.0  | 3206.3          | 2.8  | 285,000.9       | 6.7  | 463,700         | 9.1  |
| Soy             | 10.0            | 0.0  | 488.9           | 0.4  | 7587.0          | 0.2  | 11,735.0        | 0.2  |
| Grain maize     | 0.0             | 0.0  | 120.7           | 0.1  | 382.0           | 0.0  | 4345.0          | 0.1  |
| Sugarbeet       | 586.7           | 0.7  | 924.0           | 0.8  | 79,428.0        | 1.9  | 54,368.0        | 1.1  |
| Sunflower       | 351.1           | 0.4  | 189.0           | 0.2  | 885,321.0       | 20.9 | 31,564.0        | 0.6  |
| Potato          | 44,413.4        | 56.7 | 41,941.4        | 37.0 | 747,216.0       | 17.6 | 1,025,164       | 20.1 |
| Vegetables      | 7779.1          | 9.9  | 4703.1          | 4.2  | 33,726.0        | 0.8  | 47,579.0        | 0.9  |
| Cucurbits       | 31.7            | 0.0  | 126.9           | 0.1  | 0.0             | 0.0  | 0.0             | 0.0  |
| Hay             | 234.2           | 0.3  | 596.3           | 0.5  | 16,681.0        | 0.4  | 10,761.0        | 0.2  |
| Meat: cattle    | 562.5           | 0.7  | 2694.7          | 2.4  | 5865.0          | 0.1  | 144,804.0       | 2.8  |
| Pigs            | 1699.1          | 2.2  | 200.7           | 0.2  | 87,543.0        | 2.1  | 3130.0          | 0.1  |
| Sheep and goats | 102.4           | 0.1  | 113.3           | 0.1  | 18,281.0        | 0.4  | 12,198.0        | 0.2  |
| Poultry         | 54.3            | 0.1  | 183.6           | 0.2  | 5825.0          | 0.1  | 4572.0          | 0.1  |
| Milk            | 970.3           | 1.2  | 3808.5          | 3.4  | 249,107.2       | 5.9  | 329,427.0       | 6.5  |
| Eggs            | 4.9             | 0.0  | 14.7            | 0.0  | 1425.0          | 0.0  | 1020.0          | 0.0  |
| Honey           | 8.8             | 0.0  | 112.8           | 0.1  | 618.0           | 0.0  | 476.0           | 0.0  |
| Total           | 78,385.8        | 100  | 113,249.3       | 100  | 4,236,402.3     | 100  | 5,089,216       | 100  |

**Table 2** Volumes and structure of production of main agricultural products within the P(F)Es of the Tula region (2011, 2014 in comparable prices, 2017, 2018 in actual prices)

The choice of the system of final performance indicators for financial and economic activities of P(F)E is largely determined by the profitability of certain types of products, sources of financing, and marketability of production. The performance indicators for production potential harnessing in independent P(F)Es of consumer and low-commodity types (not involved in cooperation) must be adjusted for the cost of services involved.

The chosen sales system largely determines performance indicators of a peasant farm existing at its own expense and the final production results. If P(F)E is actively involved in the long-term lending, then indicators of the financial condition of agricultural producers characterizing their solvency and stability become important for assessing the quality of its work. In this case, the farm's assets, liquidity, the ratio of own, borrowed, and attracted funds are taken into account. However, the selection and adjustment of performance indicators of the P(F)E development are based on their overall totality.

| Values  | Year         |           |         |         |         |         |         |                             |  |  |  |  |
|---|--------------|-----------|---------|---------|---------|---------|---------|-----------------------------|--|--|--|--|
|   | 2011         | 2013      | 2014    | 2015    | 2016    | 2017    | 2018    | chain<br>growth<br>index, % |  |  |  |  |
| Yield, c/ha                                       | Yield, c/ha  |           |         |         |         |         |         |                             |  |  |  |  |
| Grain   | 15.4         | 25        | 29.2    | 27.1    | 25.4    | 27.6    | 28.6    | 110.3                       |  |  |  |  |
| Rapeseed  | 13.5         | 12.8      | 12.8    | 13.4    | 14.2    | 17.2    | 14.7    | 101.7                       |  |  |  |  |
| Soy   | 10.5         | 19.1      | 6.9     | 15.4    | 15.8    | 10.1    | 15.2    | 121                         |  |  |  |  |
| Grain maize                                       | -            | 58.4      | 17.8    | 41.5    | 56.1    | 51.8    | 32.5    | 110.8                       |  |  |  |  |
| Sugarbeet   | 646.6        | 506.3     | 266     | 258.5   | 213.5   | 297.9   | 476.1   | 102                         |  |  |  |  |
| Sunflower   | 8.9          | 15.9      | 11.5    | 16.4    | 13.9    | 9.2     | 13.8    | 112.2                       |  |  |  |  |
| Potato  | 232.6        | 217.7     | 188.8   | 268.2   | 308.4   | 281     | 281.3   | 104.2                       |  |  |  |  |
| Vegetables  | 209.9        | 203.1     | 176.7   | 200.2   | 261.9   | 308.8   | 245.4   | 104.4                       |  |  |  |  |
| The productiv                                     | vity of farr | n animals |         |         |         |         |         |                             |  |  |  |  |
| Average<br>daily<br>growth, g:<br>cattle          | 784.2        | 786       | 731.6   | 676.9   | 684.2   | 494     | 614.1   | 97.2                        |  |  |  |  |
| Pigs  | 515.2        | 561.2     | 599.8   | 494.7   | 763.6   | 535.7   | 455.6   | 101.3                       |  |  |  |  |
| Sheep and goats                                   | 249.3        | 166.8     | 155.3   | 184.1   | 159.7   | 111.4   | 190.6   | 101                         |  |  |  |  |
| Average<br>annual milk<br>yield from 1<br>cow, kg | 2882.40      | 5809.70   | 6683.30 | 4763.90 | 4764.70 | 5222.20 | 5525.30 | 117.2                       |  |  |  |  |

Table 3 Crop yield and animal productivity of P(F)Es of the Tula region

For P(F)Es of the Tula Region, the highest level of marketability belongs to sugarbeet (for the entire period of the study). It either amounted to or was close to 100% (Table 5). A detailed analysis of the farm products marketability indicates that its level is still pretty low. This fact is due to the peculiarities of the organization of P(F)E as a family enterprise, the owner of which seeks to use the final product to cover the personal needs of the family and further production needs (animal feed, seeds, etc.).

One of the most significant incentives for increasing marketability is the possibility of recouping the costs spent on production, sales, and decent business operations (settlement of payable accounts, tax charges, etc.), as well as accommodation costs for family members and employees of the P(F)E. All this largely depends on the market price of the manufactured products.

In 2018, the Tula Region farmers sold all types of crop production at a price higher than in 2017. The only livestock products sold at a lower price were poultry meat (by 34.6%), eggs (by 16.1%), and milk (by 4.6%) (Table 6).

|  |          |           |             | •      |        |        |        |               |  |
|--|----------|-----------|-------------|--------|--------|--------|--------|---------------|--|
| Values   | Year     |           |             |        |        |        |        | Average chain |  |
|  | 2011     | 2013      | 2014        | 2015   | 2016   | 2017   | 2018   | %             |  |
| Farmland<br>area,<br>thousand ha   | 137.7    | 148.0     | 164.8       | 185.2  | 200.6  | 195.7  | 201.5  | 106.7         |  |
| Ploughland<br>area,<br>thousand ha   | 135.8    | 141.9     | 148.4       | 171.3  | 169.5  | 165.6  | 175.4  | 104.5         |  |
| The degree of plowing, %   | 98.6     | 95.9      | 90.0        | 92.5   | 84.5   | 84.6   | 87.1   | -1.9 pp       |  |
| The gross<br>output cost<br>per 100 ha of<br>farmland,<br>thousand<br>rubles | 569.3    | 1263.0    | 687.1       | 1911.7 | 1652.4 | 2165.0 | 2525.8 | 148.1         |  |
| Produced on 1  | 00 ha of | agricultu | ral land, c | ;      |        |        |        |               |  |
| Grain  | 902.8    | 1617.6    | 2031.4      | 1988.6 | 1524.5 | 1849.7 | 1902.8 | 1.173         |  |
| Milk   | 925.6    | 1144.0    | 78.0        | 60.7   | 66.3   | 71.7   | 98.1   | 93.7          |  |
| The number<br>of permanent<br>workforces,<br>people                          | 992      | 940       | 1151        | 1433   | 1501   | 1322.0 | 1509.9 | 108.1         |  |
| Number of<br>workers per<br>100 ha of<br>farmland<br>people                  | 0.7      | 0.6       | 0.7         | 0.8    | 0.7    | 0.7    | 0.7    | 101.1         |  |
| Annual labor<br>productivity,<br>thousand<br>rubles                          | 790.2    | 1988.1    | 983.9       | 2470.6 | 2208.6 | 3204.5 | 3370.6 | 148.6         |  |
| The average<br>monthly<br>salary per<br>employee,<br>rubles                  | 6.7      | 9.7       | 10.8        | 13.7   | 12.8   | 14.3   | 15.5   | 116.2         |  |
| The cost of<br>the basic<br>production<br>assets,<br>million<br>rubles       | 1731.3   | 220.4     | 720.6       | 877.5  | 1170.5 | 674.0  | 124.8  | 109.7         |  |
| Return on assets, rubles   | 0.45     | 0.85      | 1.57        | 4.03   | 2.83   | 6.29   | 4.08   | 164.4         |  |

 Table 4
 Economic efficiency of the use of production resources of the Tula region

| Product type    | Year |       |       |       |       |       |       |       |
|-----------------|------|-------|-------|-------|-------|-------|-------|-------|
|                 | 2011 | 2012  | 2013  | 2014  | 2015  | 2016  | 2017  | 2018  |
| Grain           | 65.2 | 68.7  | 61.6  | 88.0  | 64.8  | 84.3  | 78.2  | 80.3  |
| Rapeseed        | 78.7 | 91.8  | 102.9 | 91.4  | 98.3  | 94.1  | 87.0  | 102.4 |
| Soy             | _    | 99.2  | 62.2  | 20.8  | 70.1  | 51.3  | 59.5  | 23.4  |
| Grain maize     | _    | -     | 75.8  | 100.0 | 59.6  | 81.7  | 6.5   | 21.0  |
| Sugarbeet       | 76.9 | 103.4 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 97.5  |
| Sunflower       | 60.8 | 60.8  | 10.6  | 24.0  | 82.8  | 97.7  | 51.9  | 112.9 |
| Potato          | 35.4 | 33.6  | 55.8  | 52.9  | 40.2  | 49.0  | 56.6  | 46.4  |
| Vegetables      | 37.9 | 81.1  | 55.8  | 86.7  | 69.6  | 64.2  | 35.0  | 53.3  |
| Meat: cattle    | 71.1 | 100.3 | 92.7  | 94.9  | 100.7 | 95.9  | 97.5  | 97.7  |
| Pigs            | 19.3 | 93.9  | 95.8  | 62.0  | 47.2  | 85.9  | 89.5  | 51.0  |
| Sheep and goats | 53.9 | 71.6  | 94.0  | 92.4  | 83.3  | 99.9  | 82.4  | 81.7  |
| Poultry         | 55.4 | 79.2  | 97.8  | 73.5  | 147.8 | 95.6  | 155.0 | 91.1  |
| Milk            | 62.5 | 79.3  | 84.7  | 83.7  | 78.8  | 78.0  | 79.5  | 78.3  |
| Eggs            | 11.4 | 78.2  | 71.5  | 79.4  | 98.0  | 87.5  | 2.9   | 90.3  |
| Honey           | 81.6 | 67.5  | 58.2  | 9.7   | 132.5 | 97.7  | 78.8  | 63.0  |

Table 5 The level of marketability for main types of agricultural products in P(F)Es of the Tula region, %

|                 |           | •         |           |                           |       |  |
|-----------------|-----------|-----------|-----------|---------------------------|-------|--|
| Product type    | Year      |           |           | The ratio of 2018 in % to |       |  |
|                 | 2016      | 2017      | 2018      | 2016                      | 2017  |  |
| Grain           | 819.54    | 639.91    | 955.98    | 116.6                     | 149.4 |  |
| Rapeseed        | 2344.62   | 1734.66   | 1947.98   | 83.1                      | 112.3 |  |
| Soy             | 1784.33   | 1580.63   | 2377.43   | 133.2                     | 150.4 |  |
| Grain maize     | 535.24    | 580.55    | 640.19    | 119.6                     | 110.3 |  |
| Sugarbeet       | 476.00    | 166.68    | 266.94    | 56.1                      | 160.2 |  |
| Sunflower       | 567.34    | 1134.66   | 1555.87   | 274.2                     | 137.1 |  |
| Potato          | 690.73    | 959.14    | 1051.97   | 152.3                     | 109.7 |  |
| Vegetables      | 1206.07   | 898.55    | 1125.81   | 93.3                      | 125.3 |  |
| Meat: cattle    | 10,002.75 | 9750.90   | 11310.52  | 113.1                     | 116.0 |  |
| Pigs            | 6074.85   | 14,578.67 | 17,468.75 | 287.6                     | 119.8 |  |
| Sheep and goats | 10,824.24 | 16,275.82 | 16,572.69 | 153.1                     | 101.8 |  |
| Poultry         | 15,124.29 | 19,921.34 | 13,025.64 | 86.1                      | 65.4  |  |
| Milk            | 2046.68   | 2231.42   | 2127.74   | 104.0                     | 95.4  |  |
| Eggs            | 6443.09   | 8372.5    | 7024.79   | 109.0                     | 83.9  |  |
| Honey           | 29,956.76 | 12,821.58 | 13,222.22 | 44.1                      | 103.1 |  |

 Table 6
 The sales price for the main agricultural product types in P(F)Es of the Tula region, rubles/c

Source Developed by the authors

| Sources   | Year |      |      |      |      |      |      |      |
|---|------|------|------|------|------|------|------|------|
|   | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
| Revenue-total   | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  |
| Including: gained through the sale of agricultural products | 81.2 | 79.4 | 80.4 | 87.0 | 87.9 | 85.4 | 83.5 | 89.4 |
| Gained through providing services, conducting operations    | 1.6  | 1.7  | 1.4  | 1.1  | 2.0  | 3.9  | 3.8  | 2.9  |
| State support (subsidies from budgets of all levels)        | 7.9  | 8.1  | 10.9 | 9.3  | 6.6  | 6.4  | 9.0  | 4.9  |
| Other   | 9.4  | 10.8 | 7.4  | 2.5  | 3.5  | 4.4  | 3.7  | 2.8  |

Table 7 P(F)E revenue structure in the Tula region

The impact of price changes on the overall result of the development of P(F)E branches can be estimated by comparing it with the total amount of costs spent on the manufacture of one production unit. Profitability is the main criterion for the effectiveness of a peasant (owner-operated) farm [11,12]. Its objectivity is determined not only by the fact that income is the natural goal of the farmer but also because the normal development of any farm is impossible without it. The received income allows us to meet consumer needs and cover family expenses. It also allows one to create an insurance fund and conduct expanded production. P(F)Es act as agricultural producers. The share of income achieved through the sale of agricultural products in all years exceeded 80% (Table 7). In this regard, the final indicators of economic efficiency are formed by this industry.

The net income of farm production is defined as the difference between the total amount of income (including sales revenue) and total production costs. In general, it is calculated using the following formula:

$$W = (B + PR) - IP - N$$
(1)

where:

- B revenue (cost of sold products), rubles;
- PR other revenue items, rubles;
- IP production costs, rubles;

N taxes, rubles.

As a result of financial and economic activities, the P(F)Es of the Tula Region received income in 2014, 2015, 2016, and 2017 for the entire eight-year period of the study (2011–2018) (Table 8). Moreover, the level of profitability never reached 9%. The reason for that was the outpacing growth in taxes paid by farmers (by 34.8% annually on average) over the increase in their total income (by 22.8%).

|                               |                               | -                               |   |   |                                  |
|-------------------------------|-------------------------------|---------------------------------|---|---|----------------------------------|
| Years                         | Income,<br>thousand<br>rubles | Expenses,<br>thousand<br>rubles | Paid taxes<br>amount,<br>thousand<br>rubles | Net income<br>(loss),<br>thousand<br>rubles | Profitability<br>level (loss), % |
| 2011                          | 1,501,302                     | 1,661,985                       | 47,168                                      | (207,851)                                   | (12.2)                           |
| 2012                          | 2,140,459                     | 2,192,187                       | 53,939                                      | (105,667)                                   | (4.7)                            |
| 2013                          | 2,342,270                     | 2,337,829                       | 88,356                                      | (83,915)                                    | (3.5)                            |
| 2014                          | 3,034,157                     | 2,775,851                       | 154,657                                     | 103,649                                     | 3.5                              |
| 2015                          | 4,040,443.1                   | 3,779,201.5                     | 105,552.4                                   | 155,689.2                                   | 4.0                              |
| 2016                          | 3,740,670                     | 3,563,641.3                     | 172,127.0                                   | 4901.7                                      | 0.1                              |
| 2017                          | 4,170,193                     | 3,757,139                       | 88,733.3                                    | 324,320.7                                   | 8.4                              |
| 2018                          | 5,879,042                     | 5,778,634                       | 184,005                                     | (83,597)                                    | (1.4)                            |
| Average chain growth index, % | 122.8                         | 121.0                           | 134.8                                       | -   | -                                |

Table 8 Profitability of P(F)Es in the Tula region

#### 4 Discussion

The conduct of expanded reproduction is marked with the increase in land area, livestock, gross production, crop yields, and productivity of farm animals, optimal allocation of material and monetary costs elements (salaries of employees, fertilizers, pesticides, feed, etc.), as well as the rising cost and reduction of material and moral depreciation of fixed assets. Expanded reproduction in peasant farms can be carried out in three directions, ummarized by A.V. Chayanov: "intensification ... of the farm, the possibility of using commercial earnings and, finally, the expansion of land use through renting land from other owners" [3]. To the latter, we should also add the possibility of purchasing farmland and various options for updating materials and technical means, i.e., increasing the production capacity of the P(F)E, which provides a constant increase in the gross income of the farmer. However, it is important to analyze the structure of sources providing opportunities for extended reproduction and the solvency of the peasant farm (based on the results of loan repayment over several years factoring in the liquidity of owned resources, etc.). An effective sales activity can be inferred if the company's funds predominate in it.

Recommendations for farmers on their choice of sectoral structure of economic activity are becoming particularly relevant. Our research proves that in current conditions, to ensure the reliability and stability of the P(F)E functioning, its owner must choose a model of industry specialization, which would factor in the positive impact of the maximum number of factors for the effective use of resources in specific conditions. Moreover, the model should be flexible and have maximum adaptability to the regional market and the adequate action of changing factors in the region to continually create a reliable basis for the survival of the farm and obtain the highest possible

income. The development of agricultural raw materials and food market infrastructure and the market of technical resources and services is of particular importance for the diversification of agricultural production. Unfortunately, the current level of infrastructure development does not contribute to the development of agricultural diversification.

The solution to these and many other problems of efficient farm production is associated with improved market information, since, often, the lack of it allows owners of P(F)Es to carry out activities contributing to the growth of efficiency and sustainability of their farms [2].

Research showed that the efficiency of farm production largely depends on the direction and level of state support. Moreover, nowadays, P(F)Es are experiencing significant difficulties in attracting public funds, since there is no effective infrastructure to support them. Its level is insufficient to improve the efficiency of agricultural activities.

### 5 Conclusion

The results obtained during the research should serve as an incentive for further study of the identified difficulty causes in the development of the Russian farming sector and the development of proposals for their elimination. They can become an integral part in solving a more significant problem. We refer to the strategy for purposeful regulation of the development of small rural businesses in the regions and the country, which will ensure the growth of agricultural production and increase employment in rural areas.

## References

- 1. Association of Peasant Farms and Agricultural Cooperatives of Russia (AKKOR) (n.d.) Official website. Retrieved from https://www.akkor.ru/
- 2. Baer TA (2018) Taxation as a factor for increasing the efficiency of peasant (farm) enterprises. Econ Agri Process Enterprises 11:55–60
- 3. Chayanov AV (1989) Peasant farming. Ekonomika, Moscow, USSR
- Federal State Statistics Service (2018) Results of the All-Russian agricultural census 2016, vols 1–8. IIC "Statistics of Russia.", Moscow, Russia
- 5. Federal State Statistics Service (n.d.) Official website. Retrieved from https://www.gks.ru/
- Paptsov AG, Nechaev VI, Mikhailushkin PV (2019) Towards a single innovation space in the agrarian sector of the member states of the Eurasian economic union: a case study. Entrepreneurship Sustain Issues 7(1):637–648
- 7. Rumyantsev FP (2019) On the transfer of unclaimed land shares into the ownership of agricultural organizations and peasant (farm) enterprises. Econ Agri Russ 8:26–29
- Sagiyeva R, Zhuparova A, Doszhan R, Ruzanov R, Askerov A (2018) Intellectual input of development by knowledge-based economy: problems of measuring in countries with developing markets. Entrepreneurship Sustain Issues 6(2):711–728

- Sandu IS, Svobodina VA, Nechaeva VI, Kosolapova MV, Fedorenko VF (eds) (2013) The efficiency of agricultural production (methodological recommendations). FSBSI "Rosinformagrotech", Moscow, Russia
- Skomorokhov SN (2019) Evaluation of factors influencing milk production growth in the segment of peasant farms. Econ Labor Manage Agri 9:29–35
- 11. Sushentsova SS, Nikitina IV, Kataev VI (2017) The profitability of peasant (farm) enterprises and the main directions of its increase. Econ Labor Manage Agri 3(32):127–136
- Sushentsova SS, Litvina NI (2019) An organizational-economic mechanism for the effective work of peasant farms: concept, structure, and directions for improvement. In: IOP conference series: earth and environmental science, vol 274. p 012042
- Trach D (2019) The activity of farms in the pridnestrovian Moldavian republic. APK: Econ Manage 8:92–96
- 14. Wegen SK (2013) Rural inequality in divided Russia. Taylor Francis Group, London, UK