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ESTIMATING AGRICULTURAL HOLDING PROFITABILITY IN ROMANIA

ABSTRACT

The paper makes an analysis of the profitability of agricultural holdings in Romania by main categories of holdings, based on data from the Farm Accountancy Data Network for the period 2018–2022. The main indicator that guided the analysis of farm profitability, by farm specialisation and size, was Gross Farm Income (per hectare or large livestock unit), the results showing that at farm level there is a balance of income between crop and animal farms, that there are more profitable specialisations, but also that in the case of several types of activity, small-sized holdings are in a precarious situation.

Key words: profitability, specialist farms, Gross Farm Income

JEL Classification: Q12

1. INTRODUCTION

The paper aims to provide a picture of farm profitability in Romania, taking into account both the differences between the main types of farms and the economic size differences, using public data from the Farm Accountancy Data Network (FADN). The indicator proposed in the paper for estimating profitability was Gross Farm Income, adjusted to the area unit (ha) or livestock unit (LSU); thus, it was possible to compare the 6 economic size classes defined by FADN, as well as the different types of crop farms, on the one hand, or the types of livestock farms, on the other hand.

2. STATE OF KNOWLEDGE

The detailed estimation of different aspects of farm profitability is of a constant interest for the bodies responsible for the state of agriculture at national and European level. Although comprehensive analyses at national level are relatively rare, certain circumstances (such as determining the levels for granting coupled support) favoured the emergence of such reports (Luca *et al*., 2022).

At European Union (EU) level, the analyses of the economic situation of the agricultural sector focus on tracking the evolution of farmers' incomes, in particular Farm Net Value Added (EUR/AWU), to highlight differences between the different regions of the EU and between different types of holdings (DGAgri, 2021b and 2023). These analyses are based on data collected by the Farm Accountancy Data Network, which cover most of the EU agriculture.

Larger sector-specific studies can provide valuable information on farm performance in different sectors of agricultural activity, such as reports on cereals (DGAgri, 2019) and milk (DGAgri, 2021), analyses over longer periods (usually a decade) on farm incomes (farm net value added, farm net income, family farm income), (gross, net, economic) margins, at the level of member states, regions and economic farm size classes. Sometimes incomes are differentiated by farm owner characteristics: age, gender, professional training.

3. MATERIAL AND METHOD

To estimate the profitability of agricultural holdings in Romania, data collected by the FADN between 2018 and 2022 were used. This period ensures data comparability, because since 2018, the FADN sample in Romania has included only holdings with an economic size greater than 4000 EUR standard output (and not those with a standard output between 2000 and 4000 EUR, which had been part of the sample until 2017). A more detailed analysis of the situation of holdings was carried out for the most recent year (2022) for which data were available.

The main indicator that guided the analysis of farm profitability, by specialisation and size, was Gross Farm Income, an indicator that represents the difference between the value of production and intermediate consumption, to which the balance of subsidies and taxes is added (which mainly includes direct payments as subsidies from which taxes are deducted). Thus, Gross Farm Income is an indicator that ensures the comparability between the results of agricultural production from different types of farms (with or without legal personality). For full comparability (also in terms of size), this indicator was recalculated by utilised agricultural area (expressed in ha) in the case of crops, or by size of livestock herds (expressed in LSU), in the case of animals.

Additionally, more complex indicators were proposed for comparison, yet they cannot ensure the best comparability between the different types of holdings: Net Farm Value Added (taken as such from the FADN database, expressed in EUR/AWU) and Farm Net Income (recalculated as EUR/ha).

The indicators selected for analysis were calculated as annual averages for each group of farms belonging to the same specialisation (according to the classification by 14 types of farms – TF14) and economic sizes (according to the classification by 6 size classes – ES6). Given that the specialist Olives is not found in Romania, and the category Other Permanent Crops is not represented at the level

of economic size classes, the following 12 types of farms (specialist or mixed farms) from the TF14 classification were effectively analysed:
- Specialist COP (cereals, oilseeds and protein crops) (code 15);
- Specialist Other Field Crops (code 16);
- Specialist Horticulture (code 20);
- Specialist Wine (code 35);
- Specialist Orchards-Fruits (code 36);
- Category Mixed Crops (code 60);
- Specialist Milk (code 45);
- Specialist Sheep and Goats (code 48);
- Specialist Cattle (code 49);
- Specialist Granivores (code 50);
- Category Mixed Livestock (code 70);
- Category Mixed Crops and Livestock (code 80).

The economic size classes ES6 (expressed in EUR Standard Output) were the following:
- (1) 2 000 – < 8 000 EUR;
- (2) 8 000 – < 25 000 EUR;
- (3) 25 000 – < 50 000 EUR;
- (4) 50 000 – < 100 000 EUR;
- (5) 100 000 – < 500 000 EUR;
- (6) >= 500 000 EUR.

For each farm type and size class, if data were available (i.e. there were at least 15 farms in the sample), a limited number of indicators considered relevant were analysed, recalculated per hectare or livestock unit (as appropriate), namely:
- Utilised agricultural area (ha);
- Number of large livestock units (LSU);
- Crop-specific costs (EUR/ha);
- Livestock-specific costs (EUR/LSU);
- Total subsidies (EUR/ha or LSU);
- Fertiliser cost (EUR/ha);
- Share of rented land (%);
- Feed cost for herbivores and/or granivores (EUR/LSU);
- Share of feed from own production (%);
- Depreciation (EUR/ha or LSU).

4. RESULTS AND DISCUSSIONS

SPECIALIST COP (CEREALS, OILSEEDS AND PROTEIN CROPS)

The COP farms from the FADN sample have an average area of 92.2 ha, less than 10 ha in the smallest economic size class and approximately 1,500 ha in the largest economic size class (over 500 thousand EUR standard output).

Table 1

Basic indicators of COP farms (in the year 2022)

Economic size class (ES6)	Utilised agricultural area (ha)	Crop-specific costs (EUR/ha)	Total subsidies (EUR/ha)
(1) 2 000 – < 8 000 EUR	9.1	325	192.0
(2) 8 000 – < 25 000 EUR	24.1	331	206.7
(3) 25 000 – < 50 000 EUR	56.6	338	200.4
(4) 50 000 – < 100 000 EUR	114.5	338	190.6
(5) 100 000 – < 500 000 EUR	356.8	365	183.5
(6) >= 500 000 EUR	1499.1	354	180.4

Source: FADN data processed by authors.

The highest crop-specific costs (per hectare) are found in group (5), the second largest, for which the fertiliser cost is also the highest, yet yields (at least in the case of maize) are not the highest among the groups.

Table 2

Income indicators of COP farms (in the year 2022)

Economic size class (ES6)	Farm net value added (EUR/AWU)	Gross farm income (EUR/ha)	Farm net income (EUR/ha)
(1) 2 000 – < 8 000 EUR	3060	530	215
(2) 8 000 – < 25 000 EUR	10329	622	357
(3) 25 000 – < 50 000 EUR	22658	686	425
(4) 50 000 – < 100 000 EUR	39281	693	460
(5) 100 000 – < 500 000 EUR	66387	754	513
(6) >= 500 000 EUR	87642	772	494

Source: FADN data processed by authors.

The highest average maize yield is found in group (6), and the high yield seems to be a decisive factor for the classification of this group on the first position in the ranking in terms of Gross Farm Income per ha (772 EUR/ha). The difference between the most profitable (groups 6 and 5) and the least profitable farms (group 1) was over 200 EUR/ha in 2022, on the rise compared to 2018, and these cannot be compensated by the higher level of subsidies for groups (1), (2) and (3), as a result of the direct payment redistribution mechanism.

The order of profitability given by this indicator is also maintained in the case of the farm welfare indicator (Farm Net Value Added per annual work unit), the higher level of depreciation per hectare, in the case of smaller farms, in classes (1) and (2), also contributing to this.

However, in terms of Farm Net Income per ha, the most profitable class of farms is class (5), even though these farms also have to pay a substantial rent, given that they have the highest share of rented area (84%) in all size classes (Annex 1). It is worth noting that this class also has the best output/input ratio (1.45 in 2022).

SPECIALIST OTHER FIELD CROPS

Unlike specialist COP farms, which operate large areas in a less intensive manner, farms specialised in Other Field Crops have an average area of only 17.2 ha, with 6 ha in the smallest economic size class and approximately 200 ha in the largest economic size class (over 500 thousand EUR standard output).

Table 3

Basic indicators of Specialist Other Field Crops farms (in the year 2022)

Economic size class (ES6)	Utilised agricultural area (ha)	Crop-specific costs (EUR/ha)	Total subsidies (EUR/ha)
(1) 2 000 – < 8 000 EUR	6.0	383	194.8
(2) 8 000 – < 25 000 EUR	13.3	434	207.4
(3) 25 000 – < 50 000 EUR	36.3	383	199.1
(4) 50 000 – < 100 000 EUR	76.7	333	218.0
(5) 100 000 – < 500 000 EUR	205.0	462	224.4

Source: FADN data processed by authors.

As regards specific costs, the highest values are noticed in group (5), the largest group for which averages could be calculated, but group (2) is also in a special situation, with high specific costs (also due to the cost of fertilisers, which is the highest), ranking close to the economic performance of group (5) in terms of Gross Farm Income (1285 EUR/ha).

Table 4

Income indicators of Specialist Other field crops farms (in the year 2022)

Economic size class (ES6)	Farm net value added (EUR/AWU)	Gross farm income (EUR/ha)	Farm net income (EUR/ha)
(1) 2 000 – < 8 000 EUR	3043	830	443
(2) 8 000 – < 25 000 EUR	9259	1101	731
(3) 25 000 – < 50 000 EUR	20338	1037	812
(4) 50 000 – < 100 000 EUR	36394	1035	766
(5) 100 000 – < 500 000 EUR	55036	1285	986

Source: FADN data processed by authors.

However, the largest farms (group 5) remain the most profitable, with higher unit values (per ha) than those of farms specialised in cereals, oilseeds and protein crops, perhaps also due to the higher subsidies received by these farms as a result of the receipt of coupled support.

If there had been enough farms in the FADN sample to calculate the indicators for group (6), this group would have probably performed well, as suggested by the data for previous years, even though in bad agricultural years

(2020) the performance of large farms has decreased more than that of small and medium-sized farms.

The order of the indicator Farm Net Value Added per annual work unit strictly follows the order of the economic size of farms, but in the case of Farm Net Income, the favourable situation of group (3) is worth noting, which also has a lower depreciation level.

SPECIALIST HORTICULTURE

With an average area of 1.9 ha, farms specialised in Horticulture have the highest standard output per unit area, but they also operate small land areas. The average farm size class (1) is below 1 ha, and subsidies are approximately double compared to classes (2) and (3), also as a result of receiving de minimis aid from national funds. On the other hand, large horticultural farms (greenhouses) do not have the minimum number of units (15) in a group in the FADN sample for calculating their indicators, but it can be deduced that the performance of these large farms is quite good.

Table 5

Basic indicators of Specialist Horticulture farms (in the year 2022)

Economic size class (ES6)	Utilised agricultural area (ha)	Crop-specific costs (EUR/ha)	Total subsidies (EUR/ha)
(1) 2 000 – < 8 000 EUR	0.9	1521	608.8
(2) 8 000 – < 25 000 EUR	2.2	1256	332.1
(3) 25 000 – < 50 000 EUR	5.6	1061	247.4

Source: FADN data processed by authors.

The comparative analysis of the situation of small and medium-sized farms highlights a higher production intensity in small farms (with the highest specific unit costs, also for fertilisers).

Table 6

Income indicators of Specialist Horticulture farms (in the year 2022)

Economic size class (ES6)	Farm net value added (EUR/AWU)	Gross farm income (EUR/ha)	Farm net income (EUR/ha)
(1) 2 000 – < 8 000 EUR	2103	4082	2074
(2) 8 000 – < 25 000 EUR	4563	3695	2167
(3) 25 000 – < 50 000 EUR	9245	3591	1646

Source: FADN data processed by authors.

In terms of Gross Farm Income per ha, the performance of farms in the smallest economic size class is remarkable (4,082 EUR/ha), mainly under the background of the decline in the performance of farms from class (3), which reached the last position among the three analysed size classes in 2022.

However, strictly as output/input ratio, size class (1) has the poorest performance (1.29 in 2022). Interestingly, farms in class (3) had much better performance (over 2) in 2018–2019.

On the other hand, Farm Net Value Added per annual work unit has increased with the increase in farm size in each analysed year.

SPECIALIST WINE

Although wine farms have higher unit incomes (per hectare), comparable to those of horticultural farms, the physical size of these farms is larger, with 14.3 ha on average in 2022, with a representation in the FADN sample that allows for the calculation of indicators by size classes only for three groups.

Group (5) is the most performant, with an average area of 117 ha and the lowest specific costs, yet not the lowest fertiliser costs, but with the lowest level of subsidies per hectare.

Table 7

Basic indicators of Specialist Wine farms (in the year 2022)

Economic size class (ES6)	Utilised agricultural area (ha)	Crop-specific costs (EUR/ha)	Total subsidies (EUR/ha)
(2) 8 000 – < 25 000 EUR	8.7	565	203.8
(3) 25 000 – < 50 000 EUR	20.2	473	214.1
(5) 100 000 – < 500 000 EUR	116.9	462	185.0

Source: FADN data processed by authors.

On the other hand, group (2), with the smallest farm size, has the highest specific costs (and the highest fertiliser costs).

Table 8

Income indicators of Specialist Wine farms (in the year 2022)

Economic size class (ES6)	Farm net value added (EUR/AWU)	Gross farm income (EUR/ha)	Farm net income (EUR/ha)
(2) 8 000 – < 25 000 EUR	10115	2510	1661
(3) 25 000 – < 50 000 EUR	14540	2633	1610
(5) 100 000 – < 500 000 EUR	35027	4424	2973

Source: FADN data processed by authors.

The obviously higher Gross Farm Income for class (5), twice the value of this indicator for the other two classes, is probably also due to the lower level of land

rented by these farms (only 18%). However, in the case of a bad agricultural year (like in 2020), the decrease in the value of this indicator was greater than in the case of the other two size classes, yet without creating a premise for losses. For example, the output/input ratio of class (5) in 2020 had a minimum level of 1.10, while in 2022 it reached a maximum level of 2.32.

SPECIALIST ORCHARDS-FRUITS

Farms specialised in Orchards-Fruits are also among the farms with high gross farm incomes per hectare, which means that, at an average farm size of 6 ha, those in the penultimate size class (5) have 115 ha.

Table 9

Basic indicators of Specialist Orchards-Fruits farms (in the year 2022)

Economic size class (ES6)	Utilised agricultural area (ha)	Crop-specific costs (EUR/ha)	Total subsidies (EUR/ha)
(1) 2 000 – < 8 000 EUR	2.7	575	196.6
(2) 8 000 – < 25 000 EUR	5.7	550	192.1
(3) 25 000 – < 50 000 EUR	14.6	455	201.0
(5) 100 000 – < 500 000 EUR	114.7	188	205.1

Source: FADN data processed by authors.

This is also the best performing class of the respective specialisation, with the lowest specific costs and low fertiliser costs (half the costs of the other classes).

Table 10

Income indicators of Specialist Orchards-Fruits farms (in the year 2022)

Economic size class (ES6)	Farm net value added (EUR/AWU)	Gross farm income (EUR/ha)	Farm net income (EUR/ha)
(1) 2 000 – < 8 000 EUR	3832	2863	1382
(2) 8 000 – < 25 000 EUR	9955	3633	2303
(3) 25 000 – < 50 000 EUR	20293	4205	2928
(5) 100 000 – < 500 000 EUR	61551	5865	4802

Source: FADN data processed by authors.

In addition, the depreciation level is also much lower than in the other classes, which makes the Farm Net Value Added per annual work unit also significantly higher by comparison.

As regards the evolution of Gross Farm Income per hectare, it was noticed that 2022 was a very good year for farms in class (5), although all size classes had a positive evolution. It is also worth noting that the output/input ratio of class (5) had a record level in 2022, i.e. 4.31, and class (3) also had a similar value in 2019, i.e. 4.06.

MIXED CROPS

The farms in this category are relatively small-sized farms, with an average area of 6.4 ha, and better representation in small economic size groups.

Table 11

Basic indicators of farms in the Category Mixed Crops (in the year 2022)

Economic size class (ES6)	Utilised agricultural area (ha)	Crop-specific costs (EUR/ha)	Total subsidies (EUR/ha)
(1) 2 000 – < 8 000 EUR	4.1	380	217.5
(2) 8 000 – < 25 000 EUR	8.8	418	258.0
(3) 25 000 – < 50 000 EUR	15.4	556	258.4

The best performing size class is (3), which efficiently capitalises on the higher level of specific costs (including a more intensive use of fertilisers), to obtain the highest Gross Farm Income in 2022 (even though in a certain decline compared to 2021), unlike the evolution of the other two size classes.

Table 12

Income indicators of farms in the Category Mixed Crops (in the year 2022)

Economic size class (ES6)	Farm net value added (EUR/AWU)	Gross farm income (EUR/ha)	Farm net income (EUR/ha)
(1) 2 000 – < 8 000 EUR	2908	1337	795
(2) 8 000 – < 25 000 EUR	8215	1713	1269
(3) 25 000 – < 50 000 EUR	12861	1964	1322

Source: FADN data processed by authors.

In terms of output/input ratio, the highest value was for class (2) in 2022, i.e. 1.83, but in terms of Farm Net Value Added per annual work unit, the best performing class remains class (3), also in terms of Farm Net Income per hectare, despite the large share of rented land (50%).

SPECIALIST MILK

Farms specialised in Milk had an average size of 12.3 LSU in 2022, with the average herd size in the smallest class under 5 LSU. At the opposite pole, economic size class (5) had 144 LSU on average.

The specific costs of farms in class (5), by number of livestock units, were the lowest among the classes for which indicators were calculated, although the average milk yield per cow was above that of other size classes (except for the smallest farm class in the FADN sample). In the case of farms in class (1), the high milk yield per cow was accompanied by the highest feeding cost (Annex 2). Given that these farms receive lower subsidies than farms in classes (3)–(5), the last position of this class in terms of Gross Farm Income is explainable.

Table 13

Basic indicators of Specialist Milk farms (in the year 2022)

Economic size class (ES6)	Number of large livestock units (LSU)	Livestock-specific costs (EUR/LSU)	Total subsidies (EUR/LSU)
(1) 2 000 – < 8 000 EUR	4.3	973	209.4
(2) 8 000 – < 25 000 EUR	10.6	874	275.1
(3) 25 000 – < 50 000 EUR	24.8	954	426.8
(4) 50 000 – < 100 000 EUR	47.1	862	458.7
(5) 100 000 – < 500 000 EUR	143.9	823	418.2

Source: FADN data processed by authors.

Table 14

Income indicators of Specialist Milk farms (in the year 2022)

Economic size class (ES6)	Farm net value added (EUR/AWU)	Gross farm income (EUR/LSU)	Farm net income (EUR/LSU)
(1) 2 000 – < 8 000 EUR	1240	656	143
(2) 8 000 – < 25 000 EUR	5594	951	567
(3) 25 000 – < 50 000 EUR	14201	1215	910
(4) 50 000 – < 100 000 EUR	25710	1340	1049
(5) 100 000 – < 500 000 EUR	44027	1371	1044

Source: FADN data processed by authors.

Furthermore, in the case of milk farms, the larger the farm (in terms of economic size, this also implying a similar physical size), the more profitable it is, as measured by using Gross Farm Income per LSU or Farm Net Value Added per annual work unit, or even strictly in terms of productivity (as a ratio between the value of output and input).

It is worth noting that the output/input ratio was greater than one for the entire period 2018–2022, in all size classes, except for class (1) in 2022, an alarming signal for the future of small farms specialised in milk production. This value is consistent with the decrease in the average Farm Net Income in this class to 143 EUR/LSU, *i.e.* at a lower level than the subsidy received in 2022, of 209 EUR/LSU.

The share of feed from own production represents about one third of total feedstuffs for each analysed size class.

SPECIALIST SHEEP AND GOATS

The farms with this specialisation include both small-sized farms (with herds equivalent to less than 9 LSU) and large-sized farms (with 230 LSU), the average size per total specialisation being 33 LSU.

Table 15

Basic indicators of Specialist Sheep and Goats farms (in the year 2022)

Economic size class (ES6)	Number of large livestock units (LSU)	Livestock-specific costs (EUR/LSU)	Total subsidies (EUR/LSU)
(1) 2 000 – < 8 000 EUR	8.6	652	176.7
(2) 8 000 – < 25 000 EUR	23.6	575	213.7
(3) 25 000 – < 50 000 EUR	50.6	548	239.7
(4) 50 000 – < 100 000 EUR	79.9	552	289.3
(5) 100 000 – < 500 000 EUR	230.0	492	297.1

Source: FADN data processed by authors.

Like in the case of dairy farms, specific unit costs decrease with the increase in the economic size of farms, from 652 EUR/LSU in the case of small farms to 492 EUR/LSU in the case of large ones. As in the case of specialist dairy farms, the subsidies received by small farms are lower than those of medium and large-sized farms (probably due to the conditions for receiving coupled support).

Table 16

Income indicators of Specialist Sheep and Goats farms (in the year 2022)

Economic size class (ES6)	Farm net value added (EUR/AWU)	Gross farm income (EUR/LSU)	Farm net income (EUR/LSU)
(1) 2 000 – < 8 000 EUR	2723	490	168
(2) 8 000 – < 25 000 EUR	8151	582	375
(3) 25 000 – < 50 000 EUR	17989	697	522
(4) 50 000 – < 100 000 EUR	30239	838	664
(5) 100 000 – < 500 000 EUR	43177	829	607

Source: FADN data processed by authors.

The feeding cost for sheep and goats on these specialist farms is the lowest in large farms in class (5) and highest in small farms in class (1). In fact, a larger share of feed comes from own production on larger farms.

As regards the economic results of specialist sheep and goat farms, the data describe the well-known pattern of better performance as the farm economic size increases. In 2022, only the farms in class (4) marginally outperformed those in class (5) in terms of Gross Farm Income (per LSU), this situation being the same as in 2018, being based on better values of the output/input ratio for farms in class (4).

It is worth noting that the classic indicator of farm performance, Farm Net Value Added per annual work unit, strictly follows the order of farm size.

SPECIALIST CATTLE

With an average size of 28 LSU per farm in 2022, Specialist Cattle farms have a balanced distribution by the 5 economic size classes.

Table 17

Basic indicators of Specialist Cattle farms (in the year 2022)

Economic size class (ES6)	Number of large livestock units (LSU)	Livestock-specific costs (EUR/LSU)	Total subsidies (EUR/LSU)
(1) 2 000 – < 8 000 EUR	5.3	560	241.9
(2) 8 000 – < 25 000 EUR	13.6	581	304.5
(3) 25 000 – < 50 000 EUR	32.1	565	309.1
(4) 50 000 – < 100 000 EUR	55.7	548	394.5
(5) 100 000 – < 500 000 EUR	134.6	741	363.0

Source: FADN data processed by authors.

The largest farms (class 5) had the highest specific costs, feed costs included, perhaps also due to the low share of their own feed production compared to farms from group (4), which had the best results by LSU number in 2022.

Table 18

Income indicators of Specialist Cattle farms (in the year 2022)

Economic size class (ES6)	Farm net value added (EUR/AWU)	Gross farm income (EUR/LSU)	Farm net income (EUR/LSU)
(1) 2 000 – < 8 000 EUR	709	546	6
(2) 8 000 – < 25 000 EUR	4505	667	321
(3) 25 000 – < 50 000 EUR	10269	652	344
(4) 50 000 – < 100 000 EUR	27210	1151	844
(5) 100 000 – < 500 000 EUR	35893	1114	803

Source: FADN data processed by authors.

However, in 2020 and 2021, farms in size classes (1) and (3) did not have enough FADN records for the calculation of average indicators necessary for the analysis.

This situation suggests that the cattle sector is in a period of adjustment that implies the development of smaller farms (and the transition to the next higher size class) or the exit from business. The lower level of subsidies for the smallest farms supports this hypothesis. At the same time, the fact that in the year 2022 the farms in class (1) had a sub-unit output/input ratio (0.89) confirms the difficult situation of these farms, which can obtain a positive Farm Net Income only with the help of subsidies, this being only 6 EUR/LSU.

SPECIALIST GRANIVORES

Due to the low number of specialist granivore farms (pig and poultry farming), for most economic size groups, the average indicators based on FADN data could be calculated in 2022 only for group (6), of farms with over 500,000 EUR standard output. Their average physical size was 1543 LSU, significantly higher than that of all granivore farms in the sample, of only 141 LSU.

Table 19

Basic indicators of Specialist Granivore farms (in the year 2022)

Economic size class (ES6)	Number of large livestock units (LSU)	Livestock-specific costs (EUR/LSU)	Total subsidies (EUR/LSU)
(6) >= 500 000 EUR	1542.9	739	54.4

Source: FADN data processed by authors.

Compared to other livestock farming sectors, subsidies are low, given that pigs and poultry do not benefit from coupled support, but only from animal welfare support. In addition, direct payments per area are not very high for these farms, which generally do not have land for feed production (only 7% of feed is produced on the farm).

Table 20

Income indicators of Specialist Granivore farms (in the year 2022)

Economic size class (ES6)	Farm net value added (EUR/AWU)	Gross farm income (EUR/LSU)	Farm net income (EUR/LSU)
(6) >= 500 000 EUR	32525	539	319

Source: FADN data processed by authors.

The average Gross Farm Income of farms in this category was 550 EUR/LSU in the year 2022, close to the value of group (6). The incomplete series for 2020 and 2021 refers to economic size class (1) and captures the difficult situation of small granivore farms (probably also affected by the African swine fever crisis): the output/input ratio was sub-unitary in both years, which led to negative values not only for Farm Net Income (-311 EUR/LSU in 2020 and -675 EUR/LSU in 2021), but also for Farm Net Value Added per annual work unit. In fact, 2021 was also a difficult year for farms in class (6).

MIXED LIVESTOCK

The farms in the Mixed Animals category are represented at the level of classes (1) and (2), of the smallest farms by economic size, with an average physical size of 5.3 LSU per farm.

Table 21

Basic indicators of farms in the Mixed Livestock category (in the year 2022)

Economic size class (ES6)	Number of large livestock units (LSU)	Livestock-specific costs (EUR/LSU)	Total subsidies (EUR/LSU)
(1) 2 000 – < 8 000 EUR	3.8	866	224.2
(2) 8 000 – < 25 000 EUR	8.5	772	293.2

Source: FADN data processed by authors.

With a share of own produced feed comparable to that of dairy cow or sheep and goat farms, the economic performance of the two classes is clearly in favour of the larger class, which also has better indicators for specific (and feeding) costs, and also in terms of depreciation.

Table 22

Income indicators of farms in the Mixed Livestock category (in the year 2022)

Economic size class (ES6)	Farm net value added (EUR/AWU)	Gross farm income (EUR/LSU)	Farm net income (EUR/LSU)
(1) 2 000 – < 8 000 EUR	1260	755	47
(2) 8 000 – < 25 000 EUR	3766	876	460

Source: FADN data processed by authors.

The comparison between the indicators of farms in class (1) and in class (2) highlights the fragility of smaller holdings since 2021, where the output/input ratio was sub-unitary (0.85 in 2021 and 0.94 in 2022), which anticipates a difficult situation for small farms in this subsector as well.

MIXED CROPS AND LIVESTOCK

The diversity of farms in the Mixed Crops and Livestock category is a characteristic of Romania's agriculture, with small-sized holdings of 4 ha and 1.7 LSU and large-sized farms with 225 ha and 100 LSU, with farms in the FADN sample to allow for the calculation of average indicators for each size class.

Table 23

Basic indicators of farms in the Mixed Crop and Livestock category (in the year 2022)

Economic size class	Utilised agricultural area (ha)	Number of large livestock units (LSU)	Crop-specific costs (EUR/ha)	Livestock-specific costs (EUR/LSU)	Total subsidies (EUR/LSU)
(1)	4.0	1.7	321	897	192.7
(2)	10.9	5.0	276	823	217.1
(3)	36.7	20.0	278	647	272.9
(4)	68.3	38.7	318	677	284.5
(5)	225.4	100.3	245	753	292.8

Note: (1) 2 000 – < 8 000 EUR; (2) 8 000 – < 25 000 EUR; (3) 25 000 – < 50 000 EUR; (4) 50 000 – < 100 000 EUR; (5) 100 000 – < 500 000 EUR.

Source: FADN data processed by authors.

Taking into consideration the results by size classes, one can notice a mix of two patterns already found in the case of crop farms (with higher crop-specific costs in the case of smaller farms) and livestock farms (also with higher livestock-specific costs in the case of smaller farms). As total subsidies are lower in the case

of small-sized farms, it can be assumed that coupled support plays an important role in the case of these farms.

Table 24

Complementary indicators of farms in the Mixed Crops and Livestock category (in the year 2022)

Economic size class	Fertiliser cost (EUR/ha)	Share of rented land (%)	Feeding cost for herbivores and granivores (EUR/LSU)	Share of feed from own production (%)
(1)	144.5	25	1336.7	36
(2)	119.7	54	1253.9	39
(3)	116.1	74	1034.6	40
(4)	150.8	74	1026.8	36
(5)	100.2	78	1205.2	39

Note: (1) 2 000 – < 8 000 EUR; (2) 8 000 – < 25 000 EUR; (3) 25 000 – < 50 000 EUR; (4) 50 000 – < 100 000 EUR; (5) 100 000 – < 500 000 EUR.
Source: FADN data processed by authors.

In an attempt to ensure comparability with the previously analysed sectors, the main economic indicator (Gross Farm Income) was artificially separated by crop and livestock components, using the share of crop production and animal production respectively in total production, and each component was subsequently related, as appropriate, to the number of hectares or to the number of large livestock units.

Table 25

Income indicators of farms in the Mixed Crops and Livestock category (in the year 2022)

Economic size class	Farm net value added (EUR/AWU)	Crop-related gross farm income (EUR/ha)	Livestock-related gross farm income (EUR/LSU)	Crop-related farm net income (EUR/ha)	Livestock-related farm net income (EUR/LSU)
(1)	1861	378	1034	96	263
(2)	7715	534	1183	352	780
(3)	17569	514	565	347	382
(4)	28451	580	594	434	444
(5)	54819	587	755	443	570

Note: (1) 2 000 – < 8 000 EUR; (2) 8 000 – < 25 000 EUR; (3) 25 000 – < 50 000 EUR; (4) 50 000 – < 100 000 EUR; (5) 100 000 – < 500 000 EUR.
Source: FADN data processed by authors.

Data on the crop sector suggest that larger farms are more efficient, while those on the livestock sector highlight the performance of smaller farms. Taken together, the two types of activities, based on the output/input ratio (and also on the Farm Net Value Added per annual work unit), lead to the conclusion that nevertheless farms become more efficient with increased economic size. What is specific to mixed farms is that for all size classes, a positive level of the Farm Net

Income per ha or per LSU is ensured, however with a degradation for the smallest farms in class (1), in the year 2022.

5. CONCLUSIONS

The indicator proposed in this paper for measuring the profitability of agricultural holdings in Romania was Gross Farm Income per unit area (ha) or per livestock unit (LSU), aiming at ensuring comparability between 6 economic size classes and 12 types of specialist or mixed farms, as defined by the FADN.

The analysis of this indicator, in correlation with other complementary indicators, showed that, at farm level, there is a balance of income between crop farms (which can expand more easily) and livestock farms (which have a higher output value), that there are more profitable specialisations (a summary picture in Annex 3), but that in the case of several types of activity, small-sized farms are in a difficult situation (this is the case of specialist Cattle, Granivores and Mixed Livestock farms).

A more detailed analysis, based on farm-level data, may better identify the causes of positive trends and worrying developments in different farm categories. However, investment needs in Romanian agriculture have been greater than the resources allocated through support programmes, which requires a more rigorous allocation of public support, including its better targeting towards certain specialisations and farm size classes.

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Annex 1

Complementary indicators of farms specialised in crop production (in the year 2022)

Specialisation	Economic size (EUR standard output)	Fertiliser cost (EUR/ha)	Depreciation (EUR/ha)	Share of rented land (%)
Cereals, oilseeds and protein crops (code 15)	(1) 2 000 – < 8 000 EUR	139.1	169.7	34
	(2) 8 000 – < 25 000 EUR	142.3	101.2	61
	(3) 25 000 – < 50 000 EUR	147.1	78.3	75
	(4) 50 000 – < 100 000 EUR	150.9	62.7	83
	(5) 100 000 – < 500 000 EUR	167.8	53.5	84
	(6) >= 500 000 EUR	163.4	67.8	76
Other field crops (code 16)	(1) 2 000 – < 8 000 EUR	133.6	197.8	33
	(2) 8 000 – < 25 000 EUR	155.6	137.2	57
	(3) 25 000 – < 50 000 EUR	123.6	67.3	61
	(4) 50 000 – < 100 000 EUR	122.3	79.0	72
	(5) 100 000 – < 500 000 EUR	152.4	56.7	71
	(6) >= 500 000 EUR	–	–	–
Horticulture (code 20)	(1) 2 000 – < 8 000 EUR	441.8	1303.3	20
	(2) 8 000 – < 25 000 EUR	300.9	654.0	15
	(3) 25 000 – < 50 000 EUR	236.6	482.4	34
	(4) 50 000 – < 100 000 EUR	–	–	–
	(5) 100 000 – < 500 000 EUR	–	–	–
	(6) >= 500 000 EUR	–	–	–
Wine (code 35)	(1) 2 000 – < 8 000 EUR	–	–	–
	(2) 8 000 – < 25 000 EUR	233.2	246.1	36
	(3) 25 000 – < 50 000 EUR	151.2	310.3	52
	(4) 50 000 – < 100 000 EUR	–	–	–
	(5) 100 000 – < 500 000 EUR	211.8	319.6	18
	(6) >= 500 000 EUR	–	–	–
Orchards–Fruits (code 36)	(1) 2 000 – < 8 000 EUR	150.0	738.1	20
	(2) 8 000 – < 25 000 EUR	163.1	642.4	25
	(3) 25 000 – < 50 000 EUR	135.1	469.5	40
	(4) 50 000 – < 100 000 EUR			
	(5) 100 000 – < 500 000 EUR	69.5	136.6	88
	(6) >= 500 000 EUR	–	–	–
Mixed crops (code 60)	(1) 2 000 – < 8 000 EUR	145.4	308.0	17
	(2) 8 000 – < 25 000 EUR	151.6	207.1	28
	(3) 25 000 – < 50 000 EUR	176.3	195.5	50
	(4) 50 000 – < 100 000 EUR	–	–	–
	(5) 100 000 – < 500 000 EUR	–	–	–
	(6) >= 500 000 EUR	–	–	–

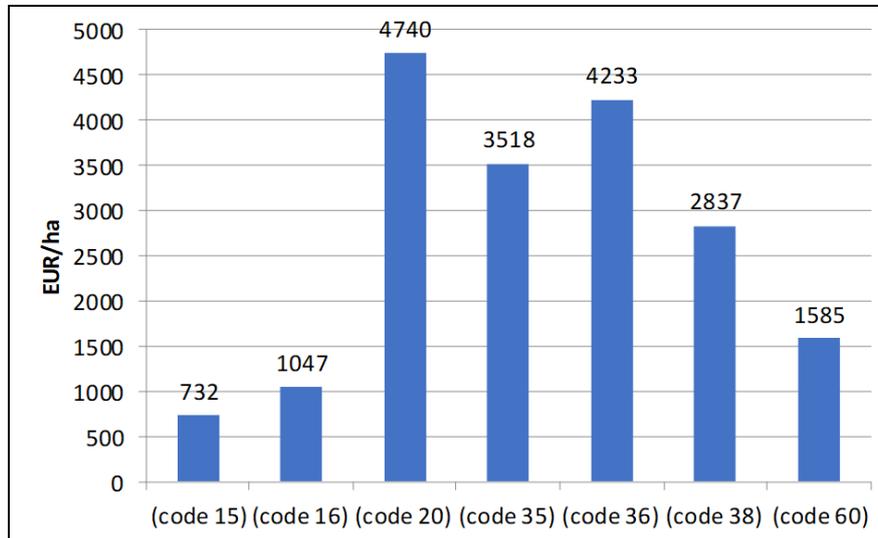*Source*: FADN data processed by authors

Annex 2

Complementary indicators of farms specialised in livestock production (in the year 2022)

Specialisation	Economic size (EUR standard output)	Feeding cost (EUR/LSU)	Share of feed from own production (%)	Depreciation (EUR/LSU)
Milk (code 45)	(1) 2 000 – < 8 000 EUR	1368.0	33	301.4
	(2) 8 000 – < 25 000 EUR	1204.0	31	176.8
	(3) 25 000 – < 50 000 EUR	1346.7	31	96.1
	(4) 50 000 – < 100 000 EUR	1243.2	33	72.3
	(5) 100 000 – < 500 000 EUR	1231.6	35	68.6
	(6) >= 500 000 EUR	–	–	–
Sheep and goats (code 48)	(1) 2 000 – < 8 000 EUR	893.3	31	97.7
	(2) 8 000 – < 25 000 EUR	780.4	31	58.0
	(3) 25 000 – < 50 000 EUR	823.2	36	41.2
	(4) 50 000 – < 100 000 EUR	849.9	38	35.1
	(5) 100 000 – < 500 000 EUR	759.9	37	38.5
	(6) >= 500 000 EUR	–	–	–
Cattle (code 49)	(1) 2 000 – < 8 000 EUR	869.1	41	335.0
	(2) 8 000 – < 25 000 EUR	871.8	37	132.4
	(3) 25 000 – < 50 000 EUR	767.3	32	133.9
	(4) 50 000 – < 100 000 EUR	915.0	43	64.9
	(5) 100 000 – < 500 000 EUR	1108.1	36	27.8
	(6) >= 500 000 EUR	–	–	–
Granivores (code 50)	(1) 2 000 – < 8 000 EUR	–	–	–
	(2) 8 000 – < 25 000 EUR	–	–	–
	(3) 25 000 – < 50 000 EUR	–	–	–
	(4) 50 000 – < 100 000 EUR	–	–	–
	(5) 100 000 – < 500 000 EUR	–	–	–
	(6) >= 500 000 EUR	756.4	7	51.4
Mixed livestock (code 70)	(1) 2 000 – < 8 000 EUR	1269.7	34	368.9
	(2) 8 000 – < 25 000 EUR	1110.1	33	245.6
	(3) 25 000 – < 50 000 EUR	–	–	–
	(4) 50 000 – < 100 000 EUR	–	–	–
	(5) 100 000 – < 500 000 EUR	–	–	–
	(6) >= 500 000 EUR	–	–	–

Source: FADN data processed by authors.

Annex 3

Unitary gross farm income by categories of farms in the year 2022

Note: Cereals, oilseeds and protein crops (code 15); Other field crops (code 16); Horticulture (code 20); Wine (code 35); Orchards-Fruits (code 36); Permanent crops combined (code 38); Mixed crops (code 60).
Source: FADN data processed by authors

Figure 1. Unitary gross farm income (EUR/ha) for crop farms in the year 2022.
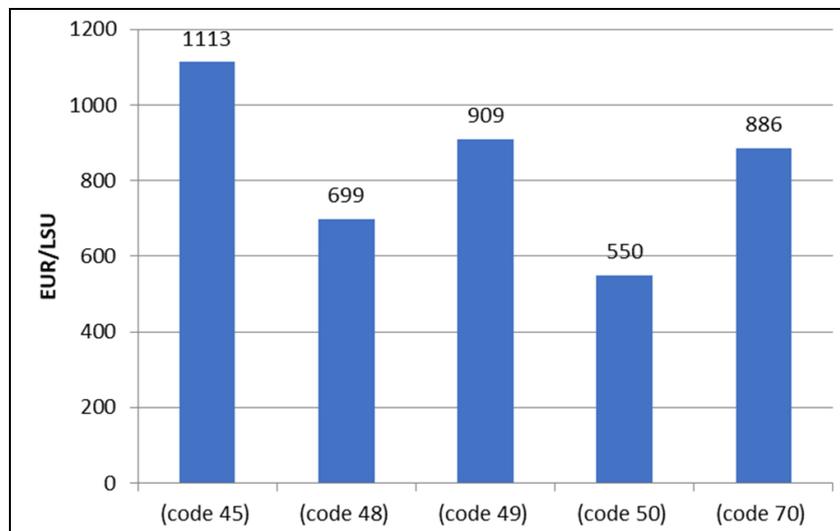
Note: Milk (code 45); Sheep and goats (code 48); Cattle (code 49); Granivores (code 50); Mixed livestock (code 70).
Source: FADN data processed by authors.

Figure 2. Unitary gross farm income (EUR/LSU) for livestock farms in the year 2022.