

# The farm size in the less-favoured areas and the economy of support spending on public goods production in the case of the Czech Republic

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**Abstract:** Opportunities for savings in both human labour and technical equipment were tested on the case of large farms situated in the less-favoured areas (LFA). Large LFA farms were found to be undoubtedly more efficient than the small ones, as well as the diversification of activities (to non-agricultural) was much wider at the large farms in the Czech Republic (CR). The targeting of the objectives of the LFA measure was analysed on the cases of the selected types of the small and large farms and also the amounts of support, devoted to reach these objectives. The paper further analyses economic results of the small and large farms in the LFA within the CR, and evaluates the impacts of the current LFA measures, where the payment distribution is based only on the grassland area, regardless of the farm size in the CR. Based on these analyses, it was suggested to distribute the LFA payments in the CR per 1ha of utilised agricultural area of farm. Also, it was showed that it would be suitable to introduce a graded decrease of the LFA payments rates according to the farm size. The analysis proves that the economic survival of the large farms, measured as the farm net value added per one annual work unit, will not be endangered.

**Key words:** farm size, less favoured areas, public goods production, economic results of farms

The proposal of the reform of the Common Agricultural Policy (CAP) after the 2013 justifies the support to agriculture as a reward for the provision of public goods associated with land cultivation and economic and social activities of agricultural holdings. The rationale for this support, therefore, is based on the fact that agriculture is regarded as an effective, and arguably the most efficient, provider of public goods. The EU Commission underlines that "Reform of the CAP must also continue, to promote a greater competitiveness, efficient use of taxpayer resources and effective public policy returns European citizens expect" (European Commission 2010a). The importance of the agriculture in the development of the countryside is highlighted also by the Organization for Economic Cooperation and Development (OECD 2006). While agriculture has an important role in shaping rural landscapes in many OECD countries, its weight in rural economies is often low and declining. Currently, less than 10% of the rural workforce is employed in agriculture in the OECD countries, the gross value added (GVA) of agriculture as a percentage of the total Gross Domestic Product (GDP) has been steadily declining and reached 2% in 2001. Despite its declining GVA, agriculture continues to have an important influence on the rural economy. It can provide outputs for the local processing or

manufacturing (agro-food businesses, for example) and contribute to providing some public goods. A large number of successful rural regions have been able to valorise public goods such as a clean environment, attractive landscapes and cultural heritage (including food). Dax (2009) pays a special attention to mountain farms: "... multifunctional mountain farming includes objectives to sustain the management of externalities supplying services and values, reflecting a rising social demand".

Studies of the agriculture and public goods production stress the role of the less-favoured areas (LFA) (European Commission 2009) "Well managed agricultural landscapes have not only high eco-system values; with their scenic and recreation feature they are a key asset for other businesses, such as the tourism industry. Such attractive landscapes managed by agriculture constitute important comparative advantages for mountain territories, since they are highly specific to their location and cannot be transferred to other places like other assets."

Other future payment limit is based on the size of farms. The assessment of the Rural Development Plan (RDP) 2000–2006 (Gwyn et al. 2003) concerning the using of the measures aimed at rewarding the public goods production in Ireland comes to the following conclusions: "Significance in some areas is that there

exists a number of farmers for whom to participate in an agri-environmental scheme is *effectively* inaccessible. This is due to their level of literacy, their age, and conservatism. These farmers do, however in many cases provide considerable public goods in the form of extremely appropriate forms of land management and their future is therefore a 'heritage' concern. To some degree or other, all the RDP measures have an imperfect penetration, with one exception. The LFA measure alone reaches almost all its target audience."

In the relation to the EU budget for the next programme period, Zahrt (2009) discusses the financing of the CAP payments. He underlines the social aspects of the payments and states that in some countries, the farmers achieve above-standard incomes, own expensive machinery and buildings and their incomes keep increasing, which is in the current economic crisis a rather sensitive matter. Conversely, the poor agricultural households benefit very little from the CAP measures.

Throughout the preparations of the future CAP legislative proposals, the issue of direct payments capping according to the farm size is widely discussed. The Commission needs to find the best use of public funds, in the light of the budgetary pressures. The EU report on the support distribution (direct payments) states that of 81.5% of direct support within the EU 27 (i.e. all 27 member states) benefited only 14.8% of all recipients in the year 2009. Approximately 62% of European farmers receive yearly support lower than 1250 Euro, while each of about 3770 largest farms in the EU receives more than 300 000 Euro per year (European Commission 2010b).

The document, prepared by the EU Commission for the EU Council, the European Parliament, the European Economic and Social Committee and for

the Committee of the Regions proposes an introduction of a special support for small farms and capping of the payment for the large farms (European Commission 2010c).

According to Wilkin (2003), until the end of the nineteen-eighties, the number of large farms significantly increased, while the number of small farms decreased. The decrease was less significant in the case of very small farms, i.e. smaller than 5 hectares. Currently, we can observe a very asymmetric ownership of the agricultural land in Europe. Notably, some countries of the Central and Eastern Europe have a very different agricultural land ownership concentration from the old EU member countries. The coefficient of concentration of the land expresses the percentage of the agricultural land owned by the 10% largest farms. Wilkin shows this coefficient to be very high in the case of the Central and Eastern Europe countries (Slovakia – 97%; Hungary – 92%; CR – 82%), compared to the old EU member countries (EU 15), where it averages only 40% (Wilkin 2003).

Large differences among the EU countries are also in the size of farms in the LFA. Figure 1 refers to an average size of farms in the LFA.

Concerning the structure of the agricultural farms in the CR, Doucha points out: "The large farms have to build their economy by exploiting the advantages of the size. This way, they can out-compete the higher flexibility of the smaller EU family farms" (Doucha and Králová 2010).

The main factors of the scale advantage are namely the following:

- a more profound division of labour in larger production volumes,
- a better organization of the production in larger production volumes,

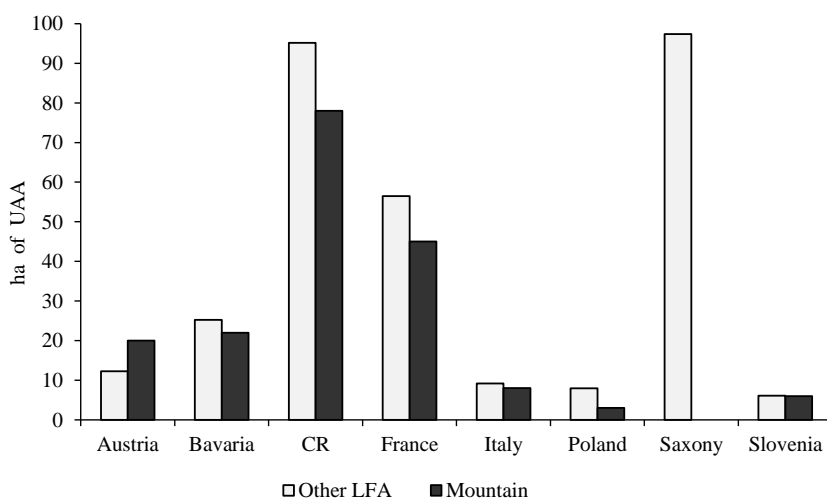


Figure 1. The average size of farms in Other than Mountain and Mountain LFA

Source: Eurostat 2007

- a sufficient investment capital for new technologies in case of large companies,
- possibilities of a better exploitation of machinery, materials and equipment on large farms,
- better conditions for the development of products and technologies in case of larger companies.

As concerns the size factor, Lukas and Pöschl (2003) expect that the smaller farms will be disadvantaged by the reform of the CAP (approaching the production prices to the world prices) and that many of such farms shall cease to continue the production and that they will lease their land. Direct support shall be too low for the small farms to avoid poverty. On the contrary, the large farms in the Central and Eastern Europe, which have invested in the modern technologies, may profit from the CAP.

Securing public goods (including the quality of environment and landscape, the value of rural structures, amenities and employment) are the core objectives of the LFA measure. Under the most recent Council Regulation No. 1698/2005, the purpose of the measure is to contribute to 'maintaining the countryside', through the continued use of agricultural land, and also to 'maintain and promote sustainable farming systems'. Concerning the LFA payments, the article 37 CR 1698/2005 says: Payments shall be degressive above a threshold level of area per holding, to be defined in the programme. In relation to the unfinished re-definition of the LFA, this part of the Council Regulation is not yet valid. It is expected that the countries, which do not yet apply the degressivity of the LFA payments (including the Czech Republic), will have to apply it in the next programme period.

There are great differences between the individual EU Member States in how they apply the LFA payments according to the farm size. Countries with a substantial reduction of payments according to the farm size are for example Ireland, Greece, Spain, France, Italy, Austria, or Portugal. In some countries (e.g. England, Wales, Cyprus, Denmark, Poland, Hungary, Sweden, or Luxembourg), the threshold after which a reduction is applied or the ceiling for the size of the eligible area is relatively high (above 100 ha).

The Czech Republic is among the EU member states, which pay the LFA support rate per hectare regardless the farm size. Similarly, the degression on the LFA payments above a certain farm area is not applied for example in Slovakia, Slovenia, Latvia, Lithuania, Finland or Scotland.

There are several farms in the CR, which have over 6000 ha of the Utilized Agricultural Area (UAA) clas-

sified as the LFA. On the contrary, there are around 5000 farms with less than 5 ha of the UAA classified as the LFA (LPIS 2010). Public goods associated with farming in the LFA are produced jointly with the private (marketed) goods. However, many of these are complex entities, with both public and private characteristics (Cooper et al. 2009). Our analysis has shown that in the production of the private goods, the Czech large farms can profit from the size advantage. If the large farms were to receive lower payments for the public goods production, it would be based on the assumption that they can produce the public goods more cheaply than the small farms. This is, however, a politically sensitive matter. Balman (2000) comes to the conclusion that a farm of 400 ha and more can profit from the size-based savings of costs. He adds, however, that the support policies of the EU are retarding the structural changes. As the economy already suffers from a high unemployment rate, the policies saving labour expenses can be hardly introduced. Aside from that, negative effects of the concentrated production are supposed to be one of the threats for the less favoured areas (Terluin and Roza 2010).

The authors analyse the economic results of small and large farms in the LFAs in the CR and the evolution of the share of the financial support on these results. Possibilities of the size-based cost savings in the case of large LFA farms are being analysed. Also, the efficiency of fulfilling the particular goals of the LFA support measures is assessed. The authors further compare the amount of support for ensuring the public good production according to the farm type. Finally, they assess the possible impact of the LFA payment capping on the large farms economy.

## MATERIAL AND METHODS

Three basic sources of data are used for the analysis: the Farm Structural Survey (FSS) of the Czech Statistical Office (CZSO) in 2007, the Farm Accountancy Data Network (FADN, IAEI) completed by the data from the Land Parcel Identification System (LPIS).

### Classification of the results of FSS

Of 29 407 agricultural land-using surveyed units, 37 farms (i.e. 0.13% by number and 1.06% by the land area) could not be assigned into any group according to the given criteria. The farms, distributed into groups according to the LFA, were further divided into 4 sub-groups according to their size (in the terms

of the UAA): below 50 ha, 50–100 ha, 100–500 ha and above 500 ha.

For the analysis of the differences in the structure of the farms and their equipment regarding the LFA type and size, the following indicators are assessed for each group: labour force usage (AWU = annual work unit<sup>1</sup> per 100 ha of UAA), machinery usage (number of tractors per 100 ha of UAA), usage of the innovative information technologies (number of farms per PC = personal computer), diversity of non-agricultural activities (the share of farms with non-agricultural activities on all farms in the group).

### Classification of the FADN farms for the evaluation of the economic results according to the LFA type and farm size

The Farm Accountancy Data Network (FADN) represents a statistical system based on a sample survey of technological and economic data on farms. The FADN collects information on the economic situation of agricultural holdings.

The Czech FADN survey included 1631 subjects; out of which 569 were business companies and 1062 were individual framers in 2008. The total area of the agricultural land of the survey participants was approximately 27% of the total UAA of the CR.<sup>2</sup>

Linking the FADN data with the Land Parcel Identification System (LPIS), it is possible for each farm in the FADN to calculate shares of land falling into each LFA type. Based on these shares, the representative type of the LFA is assigned to each farm.

Farms with more than 95% of the agricultural land situated outside the LFA are marked as farms in the favoured natural conditions. The mountains LFA farms are those with more than 50% of the UAA in the mountain regions. Other than mountain LFA

are represented by farms with more than 50% of the UAA in the category “Other” LFA and in the areas with specific handicaps. For the evaluation of the economic results of the farms before the CR joined the EU, the FADN participating farms were assorted into the LFA according to the LFA state in 2004.

From the LPIS, it is possible to calculate the area eligible for the LFA payments. The eligible area includes grassland only in the CR. The share of grassland in the UAA was chosen as an additional sorting criterion. The minimal eligible area for the LFA payment is set to 1 ha of grassland in the CR. The farms below 1 ha of the UAA are not considered for this analysis; also horticulture, viticulture etc. are excluded.

Further division of the FADN farms is performed only for the LFA farms (i.e. above 50% of the UAA in the LFA). The classification is based on the area of the UAA and the share of grasslands in the UAA. Small farms are represented by farms with the UAA below 30 ha. Considering the structure of farm size in the EU countries, some of these may already fall into the mid-sized family farms class; however, it was necessary to define the classes of the statistically relevant numbers of elements. For the same reason, the large farms are represented by farms with the UAA above 500 ha. In the CR, the farms with 500 ha and more form 5% of all the farms in the LFA and at the same time use 68% of the respective UAA. The small farms, i.e. 1–30 ha, represent 61% of all LFA farms, while they use less than 6% of the UAA in the LFA.

Classification of the “LFA-FADN” farms is summarised in the table below (Table 2).

For the groups of farms, there was analysed the situation of farms in the LFA, the importance of the LFA payments and other subsidies, their impact on economic results of farms in terms of the efficiency of public goods production assessment.

Table 1. Criteria for the classification of the surveyed units according to the LFA types

Area	Criterion	Abbreviation	Share of LFA type in UAA CR (%)
Mountain LFA	≥ 50% UAA of surveyed unit belong to mountain LFA	M	14.6
Other than mountain LFA	≥ 50% UAA of surveyed unit belong to other than mountain LFA	O	35.8
Non LFA	> 50% UAA of surveyed unit is outside LFA	N	49.6

Source: Ministry of Agriculture, RDP CR 2007-13

<sup>1</sup>Count of full-time employees (AWU – annual work unit) expresses number of employees working at full-time job and is defined as rate of number of working hours of all employees to the number of hours corresponding to a full-time working position (according to the methods of structural survey CZSO 1 AWU = 1800 hours, according to the FADN methods 1 AWU = 2000 hours)

<sup>2</sup>See the webpages of the FADN ([www.fadn.cz](http://www.fadn.cz))

Table 2. Classification of the farms with more than 50% share of the UAA within the LFA according to the grassland share and farm size

Size group of LFA farms	Area of UAA per farm	Grassland in UAA	Share in all farms in LFA (%)	Share in UAA in LFA (%)
Small farms	1 to 30 ha	> 50%	45.0	3.8
		< 50%	19.5	1.9
Large farms	above 500 ha	> 50%	1.9	17.7
		< 50%	3.8	51.3

Source: LPIS 2009

## RESULTS AND DISCUSSION

### Evaluation based on the Farm Structural Survey 2007

The results of the structural survey show significant differences in the use of labour according to the LFA and the farm size. The highest number of AWU per 100 ha of the UAA can be found in small farms up to 50 ha and especially in the non-LFA areas (Figure 2). Significant savings on labour force are observed in all size classes above 50 ha, particularly in the mountain areas (up to several times less than the LFA large farms).

Interesting results are shown by the analysis of the age structure of the labour. Table 3 shows the share of the persons of the age 65 and more in total labour according to the LFA type and farm size.

The highest share of the oldest age category is concentrated into the farms up to 50 ha of the UAA.

Table 3. Share of the workers of age 65+ in the total number of workers (%)

LFA	≤ 50 ha	> 50–≤ 100 ha	> 10–≤ 500 ha	> 500 ha
M	15.1	5.5	3.2	3.0
O	13.5	6.6	4.8	3.4
N	13.5	5.8	4.3	3.0

Source: CZSO-FSS 2007

This probably represents mostly retired people who practice farming as a hobby activity. We can expect that, similarly to Ireland, these farms operate in a way fully in accordance with the production of the environmental public goods (Gwyn et al. 2003).

The appropriate machinery usage is one of the factors, which contribute to the success of farming. The number of tractors per 100 ha of the UAA according to the defined size-classes was compared with the normative of the machinery equipment, set by Kavka et al. (2003).

The number of tractors in relation to the farm size and the natural conditions of the farms (LFA) is shown in Figure 3. The normative concentration of tractors is set to 15 per 1000 ha.

The analysis of the number of tractors per 1 hectare shows that the non-LFA farms tend to be better-equipped with tractors. This is due to a higher intensity of agricultural production (both plant and animal) in the favoured natural conditions. Aside from that, we can see that the farms below 100 ha of the UAA (and particularly those below 50 ha of the UAA) own more tractors than they can effectively use.

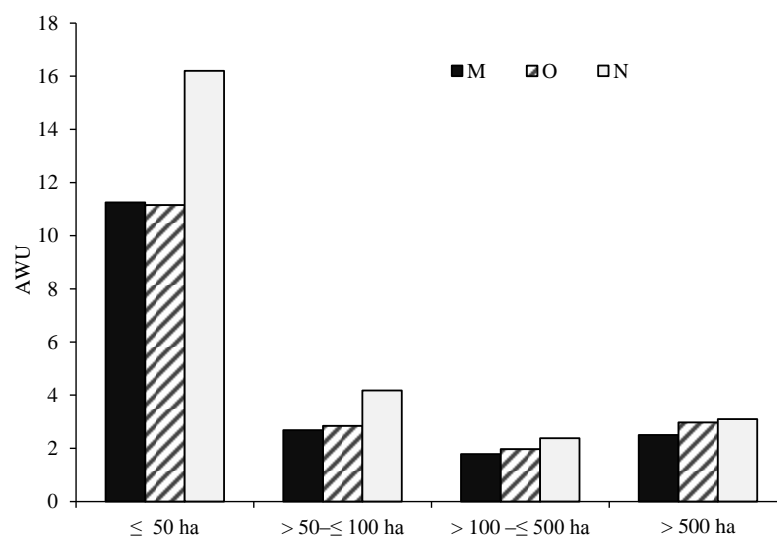


Figure 2. The number of AWU per 100 ha of the UAA according to the LFA and the farm size

Legend: M = mountain LFA, O = other than mountain LFA, N = non-LFA

Source: CZSO-FSS 2007

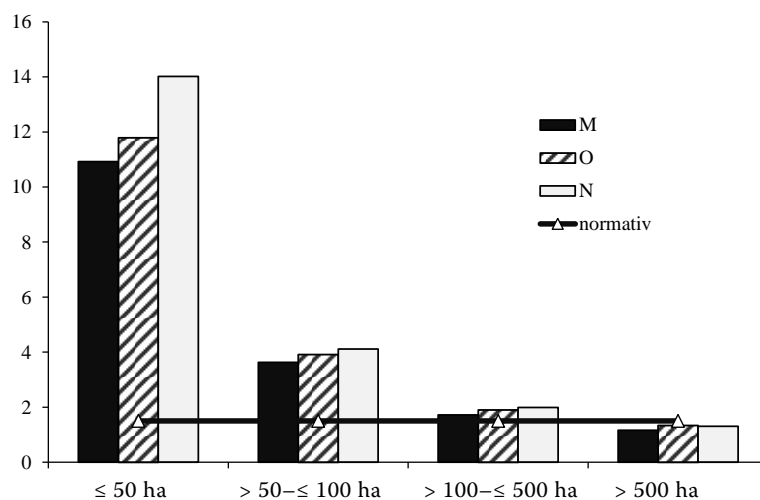


Figure 3. Number of tractors per 100 ha of the UAA according to the LFA and the farm size

M = mountain LFA, O = other than mountain LFA, N = non-LFA

Source: CZSO-FSS 2007, Normative for agricultural and food production (2003)

The importance of the access to information sources has dramatically increased in the recent years. Many information sources are available on the internet (thus accessible through personal computers – PC). Therefore, the number of PCs used on the farms was also evaluated. The Figure 4 shows the number of farms according to the LFA and the size class per one PC.

The best PC-equipped farms are the large ones (above 500 ha of the UAA), regardless the LFA category, averaging 3–5 PCs per farm. The weakest computer equipment is observed in the case of small farms (below 50 ha of the UAA). This illustrates well the important advantage of the large farms in the access to the necessary information sources.

For stabilising the economy (income) of farms particularly in the LFAs, it is important to complement

the agricultural production with non-agricultural activities. The share of the farms with non-agricultural activities in the total number of farms was calculated (Figure 5).

The chart well illustrates the fact that the diversification of activities is more common in the case of large farms, where it is performed by approximately 30% of farms, while only about 10% of the small farms carry out non-agricultural activities. The large farms have enough capital and “released labour”, thus they can more easily invest into non-agricultural productions. Chaplin et al. (2004) showed that small farms rather tend to the off-farm jobs than to the on-farm non-agricultural productions. Non-agricultural activities in accommodation and tourist services often take advantage from the attractiveness of mountain regions.

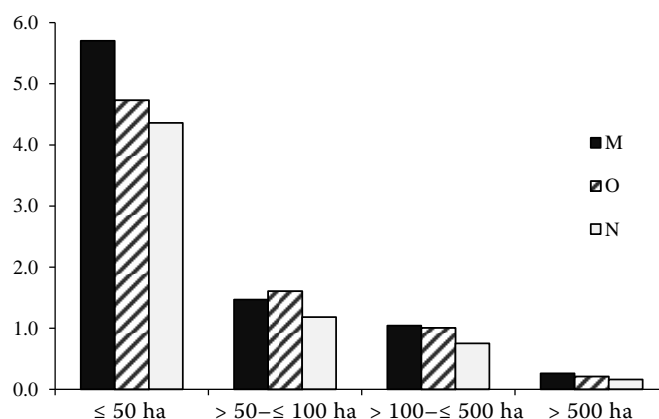


Figure 4. Number of farms per 1 PC according to the LFA and the size class

M = mountain LFA, O = other than mountain LFA, N = non-LFA

Source: CZSO-FSS 2007

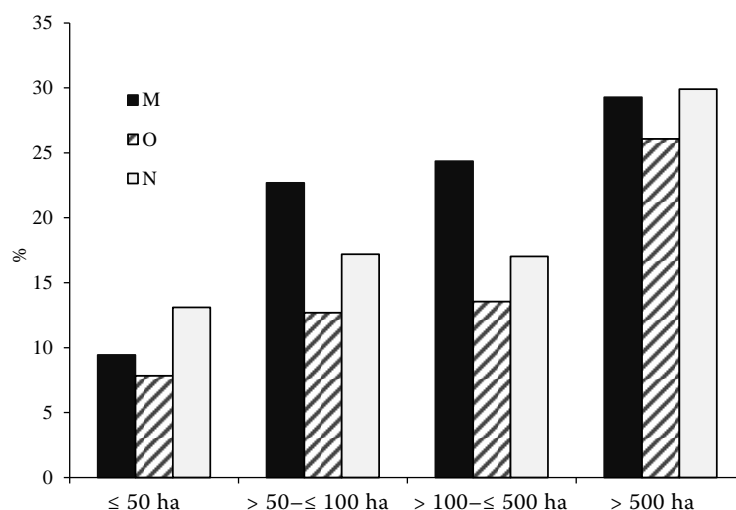


Figure 5. Share of farms with non-agricultural activities in the total number of farms

M = mountain LFA, O = other than mountain LFA, N = non-LFA

Source: CZSO-FSS 2007FA

#### Economic results of the FADN farms according to the LFA

The average farm net value added (FNVA) per 1 ha of the UAA and per AWU according to the LFA types was calculated (in Czech crowns = CZK, exchange rate per 2010 is 25 008 CZK per 1 €). Also, the amount of current subsidies (and of these, the amount of the LFA payments) per 1 ha of the UAA and per 1 AWU was quantified. LFA payments were identified, though in a negligible amount, also in the group of farms representing the most favoured areas.

This was caused by the fact that the used methodology included into representatives of these areas the farms with up to 5% of the UAA in the LFA. The role of the subsidies in the economic outcomes of the farms in various natural conditions was assessed as well as the effect of the LFA payments on the compensation of the lower incomes of the LFA against the farms in favoured natural conditions.

The data in Table 4 suggest that the LFA payments manage to compensate the incomes of the LFA farms in average in the CR. Since the EU accession, especially mountain farms have benefited from subsidies so that

Table 4. Development of the farm net value added (FNVA) in CZK per ha of the UAA

	Mountain LFA			Other than mountain LFA			The best natural conditions		
	FNVA	Current subsidies in FNVA	LFA payments in current subsidies*	FNVA	Current subsidies in FNVA	LFA payments in current subsidies*	FNVA	Current subsidies in FNVA	LFA payments in current subsidies*
2001	6 917	3 370	–	8 754	2 078	–	11 031	1 521	–
2002	6 260	3 349	–	7 199	2 129	–	7 639	1 195	–
2003	6 156	3 611	–	6 309	2 663	–	8 135	2 177	–
2004	10 020	6 003	1 786	10 560	5 049	732	13 223	4 014	13
2005	9 879	7 231	2 419	9 987	6 228	1 031	11 676	5 022	16
2006	10 802	9 602	2 651	9 806	7 569	946	12 079	6 533	8
2007	11 529	9 276	2 168	12 131	7 640	792	14 809	7 017	2
2008	10 363	10 489	2 307	10 399	8 058	870	12 964	7 462	3
2009	9 586	10 993	2 269	8 382	8 384	805	9 659	7 800	0

\*until 2004, the LFA payments were not recorded separately

Source: FADN, own calculations

Table 5. Development of the share of the current subsidies in the FNVA (%)

	Mountain LFA		Other than mountain LFA		Favoured natural conditions	
	share of		share of		share of	
	current subsidies in FNVA	LFA payments in current subsidies*	current subsidies in FNVA	LFA payments in current subsidies*	current subsidies in FNVA	LFA payments in current subsidies*
2001	49	–	24	–	14	–
2002	53	–	30	–	16	–
2003	59	–	42	–	27	–
2004	60	30	48	14	30	0
2005	73	33	62	17	43	0
2006	89	28	77	13	54	0
2007	80	23	63	10	47	0
2008	101	22	77	11	58	0
2009	115	21	100	10	81	0

\*until 2004, the LFA payments were not recorded separately

Source: FADN, own calculations

their FNVA per 1 ha of the UAA has almost reached that of the farms in the most favoured areas and it has exceeded the level of the FNVA of farms in the other than mountain LFA. The share of the current subsidies in the FNVA is shown in Table 5. It has been steadily and significantly growing throughout the observed years 2001–2009. The highest share of the subsidies in the FNVA is indicated for the mountain farms. However, the highest increase of this share has been recorded in the class of farms in the favoured areas, mainly due to the increase of direct payments per ha.

The share of the LFA payments in the current subsidies steadily decreases during the 2004–2009 time series. This is caused by the “transitional” increase of other types of subsidies, namely the direct payments, while the LFA payments are fixed for the whole programming period.

The data shown in the Table 5 clearly illustrate the increasing dependence of the FNVA results on the subsidies, the highest increase being recorded for the mountain farms. This confirms the conclusions of Harvey (2004), who states that the longer is the period of the subsidies availability, the more farms develop the dependence on this support. In the last observed years, the shares of the subsidies in the FNVA increased to that extent, that in the mountain areas they not only cover the wages, rent, interests and amortisation, but also a part of the intermediate

consumptions, since the share of the current subsidies in the FNVA exceeds 100%. The income stabilisation effect can also be seen from these figures (Tables 4 and 5). In 2009, agricultural prices fell dramatically (by 24.8% according to the Report on the State of Czech Agriculture 2010), consequently the FNVA generated by market revenues (i.e. without subsidies) dropped by 66% in the most favoured areas, while the income (FNVA including subsidies) dropped by only 25%. In the LFA regions, the income stabilisation effect was even more significant – the FNVA relied fully on subsidies and dropped by 7% in mountain areas and by 19% in other than mountain LFA.

#### Analysis of the LFA farms according to their size

The average of 2007–2009 was calculated for each parameter by the groups of farms (small farms 1–30 ha of the UAA, large farms above 500 ha of the UAA, more than 50% grassland and less than 50% grassland on UAA). During this period, the economic results of the farms were influenced by the supports in the frame of the Rural Development Programme of the CR for 2007–2013<sup>3</sup>. The farms in the LFA, which obtain higher LFA payments, have necessarily a higher percentage of the grassland in the UAA; and vice versa: the farms in the LFA, which get a lower support, are those with a lower share of grassland.

<sup>3</sup>Program rozvoje venkova ČR na období 2007–2013. Available at <http://eagri.cz/public/web/mze/dotace/program-rozvoje-venkova-na-obdobi-2007><sup>4</sup>



Table 6. Basic characteristics of the selected types of farms in the LFA (2007–2009 average)

	Small farms		Large farms	
	> 50% grassland	< 50% grassland	> 50% grassland	< 50% grassland
Number of observations in the period	54	53	185	506
Average farm size in the group (ha UAA)	19	19	1 076	1 531
Average share of grassland (% UAA)	77.1	23.5	71.7	23.0
AWU per 100 ha UAA	8.1	7.5	2.6	3.3
Share of rented UAA (%)	26	30	85	95
Share of grain on UAA (%)	19	54	17	41
Share of fodder crops on UAA (%)	80	35	79	41
Cattle LU per ha fodder crops	1.10	1.25	0.53	1.08
Share of dairy cows on cattle (%)	40	34	34	51

Source: FADN 2007–2009, LPIS 2007–2009, own calculations

Table 6 contains the averages of the basic indicators for each size category and grassland share.

These data confirm the generally accepted assumption that the smaller, family-type farms contribute more to the employment in rural areas than the large farms. They mostly farm their own land. Small farms, which have a higher share of the grasslands, mostly use their land for growing fodder crops, in a lesser amount also for the production of grain. They keep twice as much cattle (expressed in Livestock Units, LU) per 1 ha of the fodder crops as the large farms with a high share of the grassland. Also, for these small farms, milk production is important. Small LFA farms with a lower share of the grassland usually produce grain and have also a rather intensive animal production measured by the LU per 1 hectare of fodder crops. Large farms with the majority of grassland employ the lowest number of workers

in recalculation per 1 UAA. The share of the fodder crop area in the UAA is similar as in the case of small farms with the majority of grassland; the use of grassland for the cattle production is, on the contrary, very small. It can be expected that on the excessive grassland areas, not used as a source of fodder for cattle rearing, these large farms only perform mowing and removing of the grass as the public service of the landscape maintenance. The large LFA farms with a lower-than-average grassland share use their UAA for the production of both grain and fodder crops and the intensity of cattle production is twice as high as in the case of the grassland-rich large farms in the LFAs. Also, these large LFA farms with the low share of the grassland concentrate on keeping dairy cows for milk production. Table 7 shows the averages of economic indicators for each category of the LFA farm types.

Table 7. Basic economic parameters of the selected types of farms in the LFA (2007–2009 average)

	Small farms		Large farms	
	> 50% grassland	< 50% grassland	> 50% grassland	< 50% grassland
Total outputs CZK per ha UAA	39 511	39 553	18 053	32 070
Crop outputs CZK per ha UAA	9 366	17 816	6 333	14 452
Livestock outputs CZK per ha UAA	28 238	18 327	10 228	15 972
Share of livestock on total outputs (%)	71.5	46.3	56.7	49.8
Total outputs CZK per AWU	488 234	529 915	688 051	959 980
Costs CZK per 1 CZK of total output	1.03	0.87	1.50	1.23
Depreciation CZK per ha UAA	8 323	5 860	2 173	2 999
Wages CZK per paid AWU	302 439	190 119	248 223	270 468
Rent CZK per ha rented UAA	983	1 059	815	856

Source: FADN 2007–2009, own calculations

Small LFA farms can produce from 1 ha of the UAA more than twice more in the terms of the total output than the large farms with a high share of grassland. The farms with a major part of the grassland generally have a higher share of livestock in the total outputs. This is particularly true about small, grassland-rich farms, which keep a high share of dairy cows. The highest total outputs per 1 AWU can be observed in the case of large farms with the low share of the grassland. Also the large grassland-rich farms have higher outputs per 1 AWU (by over 200 000 CZK) than small grassland farms. These findings correspond to the conclusions of the first part of the analysis, that the larger farms use more efficiently the labour force. Substantial differences were revealed in the cost calculated per 1 CZK of the total output. It is generally believed that in the LFA, the farms have higher production expenses. Small farms with a high share of grassland spent approximately 1 CZK per 1 CZK of the total output, and they paid the highest wages per 1 AWU, which is probably due to their orientation on the dairy cows breeding. Small farms with a lower grassland share spent less than 1 CZK per 1 CZK of

the total outputs. The highest costs of production were recorded in the case of large farms, particularly with a high share of the grassland.

The depreciation per 1 hectare of the UAA is 2–3 times lower in the big farms group, which confirms a better and more efficient use of the equipment and machinery by these farms. Small farms pay a higher rent than large farms. Large farms are often the only land users in the given cadastral area and thus they cannot be pressed by the landowners for increasing the rental fees so easily.

Table 8 shows the components of economic results of the selected groups of farms.

Gross farm income (GFI) as well as the farm net value added (FNVA) per 1 ha UAA in the LFA is higher in the case of the small farms. Considering the fact that the large farms employ 2–3 times less AWU per area than the small ones, the GFI and FNVA calculated per 1 AWU is higher in the large farms. In the case of large, grassland-rich farms, the subsidies formed as much as 118% of the FNVA in average of the years 2007–2009. The dependence of the economic results of this category of farms on the subsidies has been

Table 8. Economic results for the selected types of farms in the LFA (2007–2009 average)

	Small farms		Large farms	
	> 50% grassland	< 50% grassland	> 50% grassland	< 50% grassland
<b>CZK per ha of UAA</b>				
Gross farm income	19 082	18 558	11 788	13 549
Farm net value added	10 759	12 698	9 614	10 550
Current subsidies, in it:	10 872	7 102	11 382	7 820
Environmental subsidies	1 773	671	2 760	785
Single area payment	3 256	3 116	3 194	3 243
LFA subsidies	2 540	716	2 679	742
<b>CZK per AWU</b>				
Gross farm income	235 798	248 629	449 263	405 588
Farm net value added	132 946	170 123	366 430	315 821
Current subsidies, in it:	134 345	95 149	433 795	234 072
Environmental subsidies	21 914	8 991	105 186	23 484
Single area payment	40 232	41 751	121 714	97 079
LFA subsidies	31 386	9 594	102 105	22 216
<b>CZK per farm</b>				
Current subsidies, in it:	202 463	132 939	12 279 132	11 971 098
Environmental subsidies	33 026	12 562	2 977 415	1 201 035
Single area payment	60 631	58 333	3 445 273	4 964 892
LFA subsidies	47 300	13 404	2 890 222	1 136 192

Source: FADN 2007–2009, own calculations

growing sharply since the CR joined the EU. While in 2004 the subsidies formed 74% of the FNVA, in 2006 it was already 109% and in 2009 the current subsidies represented 128% of the total FNVA.

The farms with a high share of the grassland receive particularly large amounts of the environmental subsidies. This is a consequence of the fact that approximately 60% of environmental subsidies expenditure in the CR (including organic farming and integrated production subsidies) is intended to the subsidies for the grassland maintenance. It is often the large farms with a high share of the grassland and the extensive animal production, which obtain the environmental subsidies. These farms used more abundantly the environmental programs (2760 CZK per 1 ha of UAA), while small grassland-rich farms received about 1000 CZK less. This correspond with the findings that transaction costs can be a barrier for farmers to participate in the voluntary agro-environmental schemes, especially for smaller farmers (Falconer et al. 2011). The grassland maintenance and organic farming at the large, grassland-rich farms are supported by the amount of 105 000 CZK per 1 AWU, while in the case of small grassland-rich farms, it is only 22 000 CZK per 1 AWU. An unbalance can be observed in the LFA payments calculated per the UAA between the farms sorted according to the grassland share and per 1 AWU according to the farm-size.

## CONCLUSION

The analysis of the results of the structural survey of agriculture in the CR proved undisputedly a more effective use of both the human labour and machinery by the large farms, situated in the LFA, than by the small farms. Equally, the diversification of incomes by performing non-agricultural activities is more frequent in the case of large farms. A better use of human labour on the large farms can be seen by the more than double volume of the total outputs per 1 AWU compared to the small farms, a better use of machinery is reflected in the low depreciation per 1 ha of the UAA in the case of large farms.

Considering the fulfilling of the objectives of the LFA measure, it was found that the LFA payments, especially in mountain areas, compensate the economic losses in the LFA to such an extent that their FNVA per 1 ha of the UAA has almost reached that of the farms in the most favoured areas and has exceeded the level of the FNVA of the farms in the other than mountain LFA. Notably, the same objectives, i.e. the continuation of agricultural production and the maintenance of the landscape, are achieved by the

small and large LFA farms with significantly different amounts of support, varying by thousands of CZK per 1 ha of the UAA. At present, there is in the CR a group of large and very large farms, generally managing the grassland with a very low-intensity of cattle breeding. The costs in recalculation per 1 CZK of their agricultural production are, however, very high. With the LFA support payments, distributed according to the grassland area, and other subsidies, these large farms manage to reach satisfactory economic results and their GFI and FNVA per 1 AWU is the highest of all other categories of the LFA farms. While in the case of other types of the LFA farms (small and/or poor on grassland), the expenses of taxpayers on keeping 1 AWU in the LFA are approximately 20–30 thousands of CZK, in these large grassland-rich farms it is more than 100 thousands CZK. Additionally, the small farms fulfil much better another goal of the support, namely to maintain employment in the rural regions. The number of annual work units per 100 ha of the UAA is 4.1 respectively 5.5 times (depending on the grassland share) higher than on large farms with a similar land use structure.

At present, there is an intensive discussion about the future of the LFA measure among the Commission, the Ministry and the concerned NGOs. The original motivation for the LFA support limited to the grassland only was to decrease the percentage of the arable land in the mountain and foothill areas, the residue of an intensive-agriculture during the period of the socialistic planned economy. Water erosion and the catastrophic floods in 1997, 2002 and 2006 were taken as a strong justification for all erosion- and flood-limiting measures. On the other side, the LFA payments supporting only the grassland maintenance caused a high unbalance in the support among the LFA farms. In addition, this policy has resulted in an increase of the dependence of some LFA farms on the subsidies. The European Commission (2011) proposal for a regulation after 2013 has extended the area eligible for the LFA support to the whole UAA. This will mitigate the above-mentioned differences in the supports between farms in the LFA. It should be in terms of the CR accompanied by an emphasis on the anti-erosion effect of other measures of the CAP. The gradually increasing anti-erosion measures are becoming included into the approved good agricultural and environmental conditions (GAEC) in the CR and thus are among conditions for the direct payments. Therefore, they can effectively and for the whole area of the CR fulfil the proclaimed aims instead of the LFA payments.

Other future payments limit is based on the size of farms. It would in the CR significantly affect the eco-

conomic results of the large, grassland-rich LFA farms. Large LFA farms with a lower grassland percentage already feel the limitations of the LFA payments as they receive them for a much smaller share of their UAA compared to the grassland-rich LFA farms. Therefore, if the incomes from the LFA payments of the farms above 500 ha UAA with a high percentage of the grassland are decreased by one third, they would still receive in average by over 11 million CZK of current subsidies per 1 farm. In this case, the FNVA per 1 AWU - as an indicator of the viability of a farm - would exceed 415 thousands CZK, which is still the highest value among the analysed LFA farm categories. It is possible to conclude that there is a space for introducing the degressivity of the LFA payments depending on the farm size in the CR. However, a sensitive approach would be necessary, as the large farms (above 500 ha of the UAA) are currently managing a crucial part of the land in the LFA (68% of the UAA). Consequently, it would be necessary to set the conditions so that it would still be profitable for these farms to provide the maintenance of grasslands.

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