

# Economic evaluation of cattle management in the system of organic farming

*Ekonomické hodnocení chovu skotu v podmírkách ekologického hospodaření*

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**Abstract:** This paper introduces partial results of the research project QC 1140 aimed at the efficiency of enterprises operating in the system of organic farming, especially considering the use of grassland linked with cattle management. Economic evaluation of cattle management in the system of organic farming is compared with conventional enterprises. Economic evaluation applies to dairy cattle and beef cattle. Proposals of the measures will be formed with respect to the results of analysis, which should contribute to the support of organic enterprises and to better satisfaction of the increasing demand for organic food.

**Key words:** organic agriculture, economical evaluation of cattle management, development of organic agriculture, support of organic agriculture

**Abstrakt:** Příspěvek uvádí vybrané výsledky výzkumného projektu zpracovávaného v rámci NAZV, jehož součástí je i efektivnost chovu skotu. Ekonomické hodnocení chovu skotu u ekologických podnikatelských subjektů je porovnáno s podniky hospodařícími konvenčním způsobem a týká se dvou vybraných kategorií, a to krav bez tržní produkce mléka a chovu dojnic. V návaznosti na výsledky analýz jsou formulovány návrhy opatření, které by měly přispět k podpoře ekologicky hospodařících podniků a tím k lepšímu uspokojení zvyšující se poptávky po biopotravinách.

**Klíčová slova:** ekologické zemědělství, ekonomické hodnocení chovu skotu, vývoj ekologického zemědělství, podpora ekologického zemědělství

Organic agriculture represents an appropriate alternative to conventional farming it uses traditional technical and technological methods. Organic agriculture has a positive impact on all components of environment and also gives answers in the social and economic field. Enterprises practicing organic system of farming are bound with a number of regulations, especially the Government Regulation on Organic Agriculture No. 242/2000, which sets certain responsibilities and restrictions for organic enterprises. These responsibilities and restrictions could influence enterprises' economic results in the end.

There were operating 717 organic enterprises on 235 136 hectares in the Czech Republic in 2002. It corresponds with 5.5% of agricultural land. In the last years, organic agriculture is expanding mainly in the montane and submontane, regions where the production ability of the area is lower. This corresponds also with the structure of the certified land area in 2002, where the permanent grasslands represented 90% of land in the organic system of farming. Similar situation is known also in Austria, Scotland and other countries. Due to the low burdening of agricultural land with cattle (0.7 livestock unit per hectare), this trend is favourable, because part of these areas are reservoirs of the quality drinking water.

## GOALS AND METHODOLOGY

The aim of this paper is economic evaluation of cattle management and the closely linked permanent grasslands, also the suggestion of the necessary measures for support and development of these sectors in the system of organic farming in the Czech Republic. The suggestion of measures is based on the quantification of the results.

The results were summarized on three basic related complexes to inspire the mentioned goal.

First complex of problems includes the determination of the sample file of enterprises in the system of organic farming.

The second complex of problems includes the analysis of cost and profitability of organic and also conventional enterprises. The cost of organic products was measured with respect to the direct and indirect costs in the same structure as it is measured in enterprises included in the sample file of the RIAE (Research Institute of Agricultural Economics) due to the possibility of comparing the results of organic enterprises' sample file with this sample file. The comparison of the organic and conventional sample file is accomplished with the help of weighted arithmetical average. Per hectare yield is used for

evaluation of permanent grasslands' profitability; efficiency per head and year, average farmers' price per one liter of milk is used for evaluation of milking cows.

The third complex of problems deals with suggesting the modification of support's level of the analysed sector in the system of organic farming, partly by direct financial payments, partly by non-financial support.

## RESULTS

### Appointing the sample file of organic enterprises

The actual appointing of the sample file of organic enterprises was done by a questionnaire. On the basis of this questionnaire, there were found out basic informations about the enterprises, from which the sample file of organic enterprises was appointed.

The result of this assortment is the sample file of 52 organic enterprises; their basic characteristics are listed in Table 1.

The sample file of 52 enterprises represents 7.25% of all organic enterprises. Its land area 27 547 hectares of agricultural land represents 11.72% of total organic land area.

### Cost of beef cattle management

Major part of the organic enterprises' sample file, almost 70%, deals with beef cattle management. The cost data of this animal husbandry sector are listed in Table 2.

The organic enterprises' sample file has a lower cost per head and year by 15.8% than the conventional enterprises' sample file. Direct labor expenses are lower comparing the individual cost items. Other cost items are basically comparable. The disparity in direct labour cost can be derived from the different methodology of calculation used by legal entities and individual farmers – the latter do not include their own labour into direct labour costs. Due to the fact, that individual farmers represent a major part of the organic sample file dealing with beef cattle management, it is possible to figure, that the men-

Table 1. Basic characteristics of sample file of organic enterprises

Legal title	No. of subjects	Agriculture land	Acreage of organic land in hectares			
			arable land	hayfields	pastures	vineyards
LLCs	14	12 195	1 482	5 546	5 167	
Corporations	3	179	179			
Cooperatives	3	2 333	761	582	990	
Legal Entities	22	14 707	2 421	6 128	6 157	
Other	2	2 054	94	1 059	901	
Individual farmers	30	10 787	1 769	4 826	4 186	6
In total	52	27 548	4 285	12 013	11 244	6

Table 2. Cost of beef cattle

Cost item	Total cost in CZK per head and year		Cost structure per head and year in %	
	organic	conventional	organic	conventional
Feed	5 243	5 402	34.6	30.0
bought	230	456	1.5	2.5
own production	5 013	4 946	33.1	27.5
Pharmaceuticals and disinfectants	49	80	0.3	0.4
Other direct materials	117	303	0.8	1.7
Direct material cost in total	5 409	5 784	35.7	32.1
Other direct cost and services	663	999	4.4	5.5
Direct labor expenses including social and health insurance	1 161	3 560	7.7	19.8
Cost of subsidiary activities	888	651	5.9	3.6
Depreciation of long-term tangible assets	756	121	5.0	0.7
Depreciation of herd	3 304	3 554	21.8	19.7
Indirect cost	2 973	3 336	19.6	18.5
Total cost	15 155	18 005	100.0	100.0

Table 3. Cost of dairy cattle

Cost item	Total cost in CZK per head and year		Total cost in CZK per 1 litre of milk in %	
	organic	conventional	organic	conventional
Feed	11 412	16 486	32.3	35.6
bought	3 143	6 826	8.9	14.7
own production	8 269	9 661	23.4	20.8
Pharmaceuticals and disinfectants	53	499	0.2	1.1
Other direct materials	585	1 061	1.7	2.3
Direct material cost in total	12 051	18 046	34.1	38.9
Other direct cost and services	4 852	4 285	13.7	9.2
Direct labor expenses including social and health insurance	6 798	9 570	19.2	20.6
Cost of subsidiary activities	828	1 448	2.3	3.1
Depreciation of long-term tangible assets	554	1 901	1.6	4.1
Depreciation of herd	3 758	4 720	10.6	10.2
Indirect cost	6 535	6 377	18.5	13.8
Total cost			100.0	100.0
	35 376	46 348	8.52 CZK	7.76 CZK

tioned difference in methodology influences the level of direct labour costs.

It is possible to conclude, that with respect of above mentioned facts, the costs of beef cattle management do not need to be different in both systems of farming.

### The cost and profitability of dairy cattle management

21% of enterprises included in the organic enterprises' sample file deal with dairy cattle management. The cost and profitability data of this animal husbandry sector are listed in Table 3.

The organic enterprises' sample file has a markedly lower cost (by 23.7%) per head and year than the conventional enterprises' sample file. The disparity is caused by a lower cost of feed, especially bought feed, direct labor cost, depreciation of herd and also depreciation of the long-term tangible assets.

The cost per one liter of milk is higher by 9.8% for farmers in the system of organic farming. The disparity is related to the performance, which is lower in organic enterprises by 1 778 liters per head and year. This disparity is very significant, because it represents almost one

third. Different is also the average farmers' price per one liter of milk, although the difference is not very distinctive; organic farmers are getting by 4% higher price. Organically produced milk is only exceptionally sold as organic. Due to this reality, the producers are forced to sell their products as conventional. There can be seen efforts of some organic producers to acquire their own or shared processing facilities for the consumers' sake and also on behalf of a better realization of organic products.

### Cost and profitability of hayfields and pastures

In the sector of hayfields and pastures, it is significant, that organic farmers are concentrated primarily on animal husbandry, especially on cattle management, where hayfields and pastures play a dominant role the system of organic farming. The majority of the enterprises included in the sample file deals with this sector, i.e. 69.23%, which represents 36 enterprises.

The per hectare cost of harvested pasture is higher by 1 249 CZK, i.e. by 37% for farmers in the system of organic farming. The disparity is related to indirect costs, other direct costs and services. The total direct material costs are lower by 25% for farmers in the system of organic farming, which is caused by not using artificial fertilizers.

The per hectare cost of harvested hayfield is also higher by 41% for farmers in the system of organic farming. The disparity is related to the parallel cost items as for pastures.

The cost of one ton of green fodder from organic hayfields is 312 CZK, which is by 46% higher than the cost of conventional enterprises. The per hectare yield differ-

Table 4. Revenues – dairy cattle

Item	Unit	System of farming	
		organic	conventional
Efficiency	liter/head/year	3 681	5 459
Average farmers' price	CZK/liter	7.91	7.58

Table 5. Cost of hayfields

Cost item	Total cost in CZK per 1 ha of harvested land		Total cost in CZK per 1 ton of green fodder in %	
	organic	conventional	organic	conventional
Seeds	211	138	4.6	4.1
bought	99	57	2.2	1.7
own production	112	81	2.4	2.4
Fertilizers	163	598	3.5	17.8
bought	6	403	0.1	12.0
own production	157	195	3.4	5.8
Plant protection	0	21	0.0	0.6
Other direct material	242	61	5.2	1.8
Direct material cost in total	616	818	13.4	24.3
Other direct cost and services	1 133	141	24.6	4.2
Direct labor expenses including social and health insurance	427	868	9.3	25.8
Cost of subsidiary activities	634	835	13.8	24.8
Depreciation of long-term tangible assets	16	19	0.4	0.6
Indirect cost	1 784	683	38.7	20.3
Total cost			100	100
	4 611	3 362	312 CZK	213 CZK

ence is very small (only 6.5%), so it is possible to figure, that hayfields in the system of organic farming are the sector with higher cost.

The cost of one ton of green fodder from organic pastures is also higher than from conventional pastures. The difference is 72%. The pastures have a higher difference in per hectare yield than hayfields – organic pastures have by 21% lower yield than conventional pastures. Per hectare yield of pastures is quantified via cattle consumption of green fodder.

Higher costs in both sectors reflect especially the use of suppliers for the maintenance of permanent grasslands.

The farmers' price is not shown in the organic neither in the conventional sample file, because the sale of final product is not common for the sector of hayfields and pastures.

### Summary of cost and profitability analysis of organic products

Nowadays, there are in the Czech Republic organically managed 13 268 heads of cattle according to the KEZ (Control of Organic Farming), by 31. 12. 2001. The total production of organic beef was 1 066 tons in the mentioned year, what represented 1% of the total weight of slaughtered beef.

Consumers' interest in the certified beef meat is on a good level and it is still increasing. The consumer appreciates the fact that the meat comes from farms with natu-

ral conditions of cattle management. The goal of this type of cattle management is not a high efficiency, but animal welfare, the possibility of natural living conditions which would lead to final products of the consequently valuable, healthy food. The increase in supply of organic beef depends on economic results related to the cattle management.

Organic enterprises utilise subsidies which play a significant role in cattle management. The most frequently used subsidy title is the Support Program 1.L – Dairy Cattle Management. Here, the subject of support is a calf born from beef cow. The level of this subsidy, provided as a direct irrecoverable subsidy, fluctuates in the range between 7 500 CZK in montane regions, through 6 500 CZK in other LFA, and 4 000 CZK in the not listed areas. The mentioned numbers represent the maximum level of subsidy.

The listed subsidies help to cover the total costs in cattle management. These costs are for beef cattle management in the system of organic farming 15 155 CZK per head and year. Major part of these costs are costs of own feed. It is necessary to consider, as was mentioned

Table 6. Revenues – hayfields

Item	Unit	System of farming	
		organic	conventional
Per hectare yield	t/ha	14.78	15.81
Average farmers' price	CZK/t	–	–

Table 7. Cost of pasture lands

Cost item	Total cost in CZK per 1 ha of harvested land		Total cost in CZK per 1 ton of green fodder in %	
	organic	conventional	organic	conventional
Seeds	43	133	1.3	5.5
bought	43	112	1.3	4.6
own production	0	21	0.0	0.9
Fertilizers	224	439	6.5	18.0
bought	4	374	0.1	15.4
own production	220	65	6.4	2.7
Plant protection	0	6	0.0	0.3
Other direct material	404	139	11.8	5.7
Direct material cost in total	671	718	19.6	29.5
Other direct cost and services	1 053	170	30.7	7.0
Direct labor expenses including social and health insurance	298	539	8.7	22.1
Cost of subsidiary activities	275	400	8.0	16.4
Depreciation of long-term tangible assets	189	24	5.5	1.0
Indirect cost	942	582	27.5	23.9
Total cost		100.0	100.0	
	3 428	2 434	307 CZK	179 CZK

above, that the cost of green fodder and hay is partially covered by subsidies allocated for the maintenance of permanent grassland. The level of subsidy fluctuates between 1 000 CZK for hayfields and 3 100 CZK for pastures, what represents 22% out of the total cost for hayfields and up to 90% for pastures.

If we consider the above-mentioned facts regarding costs of own feed for beef cattle management, we can assume that the actual cost not covered by the subsidy is 2 505 CZK. This number is derived from the speculation, that the cost related with pasture is about 50–60% out of total costs of own feed and that the remaining 40–50% are related to hay gained from hayfields and pastures.

One calf pertains to one beef cow per year. The subsidy for 1 calf also conduces the cost coverage of beef cattle management. Due to the fact, that the organic cattle management is practiced mainly in the LFAs, it is possible to assume, that organic farmers gain the subsidy at the level of 6 500 to 7 500 CZK per one calf.

If we subtract the above mentioned subsidy from the total cost per one beef cow and consider the above mentioned partial coverage of the own feeds' costs, the remaining cost is from 5 150 to 6 150 CZK per head and year. It is also necessary to consider the revenue gained by culling the cow out of the herd. The expected revenue is about 9 600 CZK if we consider the average price per one kilogram of live-weight of a slaughter cow, quoted in the "Situaci a výhledová zpráva skot – hovězí maso", Ministry of Agriculture CR, December 2002, as 19.21 CZK. The average revenue per year is 1 920 CZK if we consider the average age 5 years. Regarding these figures, it is noticeable, that the loss from one beef cow is about 3 230–4 230 CZK per year. It is obvious, that the subsidy title for beef cows is fully legitimate for organic as well as for conventional farmers – they have even higher (by 2 850 CZK) total costs per head and year, so it would be possible to recommend an increase in the provided subsidy.

Milk is the food which has an irreplaceable role in human nutrition. Organic milk increases requirements for food quality. It is noticeable from the results of the analysis, from the organic farmers' attitude, that it is problematic to sell organic milk and that farmers are forced to sell their products as the conventional ones.

Nowadays, there are produced 93.2 mil. liters of organic milk in the Czech Republic. This amount corresponds with 4.5% of the total milk production.

It could be concluded on the basis of the carried out analyses, that production of milk in the system of organic farming is non-economical. The cost per head and year

Table 8. Revenues – pasture lands

Item	Unit	System of farming	
		organic	conventional
Per hectare yield	t/ ha	11.8	13.58
Average farmers' price	CZK/t	–	–

is 35 376 CZK, while the revenues per head and year are 29 116 CZK if we use for calculation the average farmers' price 7.91 CZK per one liter of milk. The loss is then 620 CZK per head and year. If we use the average farmers' price 8.18 CZK (indicated by the Association of Organic Farmers PRO-BIO in 2001) for calculation of revenues, the production still remains non-economical. In this case, the loss is 5 265 CZK per head and year.

The loss of organic milk production is also related to a lower efficiency, as it was already mentioned above. Efficiency of the organic sample reaches 67.5% of the conventional sample fil's efficiency and 63.4% of the average efficiency in the Czech Republic.

Dairy cattle management is not directly supported at present. Due to the mentioned importance of milk in human nutrition, the support of dairy cattle management in the system of organic farming could be recommended at the minimum level of 4 000 CZK per head and year. The remaining part of the loss has to be considered by the processor in evaluation of the organic quality by about 0.5 CZK per one liter. The total revenues would then increase by 1 840 CZK in this case and the loss would be decreased to 4 420 CZK. Organic farmers have to partially increase their efficiency to assure competitiveness and profitability in this sector.

Hayfields and pastures are important in the system of organic farming sector, which is always necessary to combine with cattle management. The per hectare cost fluctuates between 3 428 and 4 611 CZK. Due to the Government Regulation No. 505/2000, which modifies subsidy programs for the support of non-production functions of agriculture, the support for activities participating in countryside maintenance, support programs for the LFA and the criteria for their definition, it is possible to draw subsidies for permanent grasslands from three individual support programs in the framework of support programs allocated for the maintenance of permanent grasslands on agriculture land, for technological or organisational safeguarding of pastures for farm animals on agricultural land, and for partial coverage of loss caused by operating in the organic system of farming.

If we consider the amounts from the individual, already mentioned support programs, which can be drawn for hayfields and pasture, this sector appears to be adequately subsidized.

The per hectare cost of pastures is 3 428 CZK, the possible subsidy represents, with respect to the above mentioned facts, the total amount between 2 500 and 3 100 CZK per hectare. It means, for organic enterprises, which show a lower burdening of permanent grasslands with livestock unit (0.250–0.450), that the possible subsidy can be 75% of the total costs. For enterprises, which show a higher stress (0.451–1.000 livestock unit per hectare), it means, that the subsidy can cover up to 90% of the total cost.

The per hectare cost of hayfields is 4 611 CZK. The possible subsidy represents in this case only 1 000 CZK. This amount is given by the agro-environment support program allocated for the partial coverage of loss caused by oper-

ating in the organic system of farming. In this case, the subsidy covers only 22% of the total per hectare costs of hayfield. The mentioned compensation is reflected in the coverage of own feeds cost in cattle management.

## DISCUSSION

Out of the results of the carried out analysis, it is possible to suggest the recommendation for adjustment of financial subsidies.

The attention was aimed at milk cows and other cattle in animal husbandry. It is possible to say, that milk cows are the sector, which is not directly supported nowadays. We recommend to launch the financial subsidy in the minimum level of 4 000 CZK per one milking cow.

For other cattle, it is possible to recommend increasing the subsidy for organic farmers rising from the Support Program 1.L – Dairy Cattle Management, Sheep and Goat Management from the current level (6 500 CZK) up to 7 500 CZK, per one born calf from 1 000 to 2 000 CZK. This subsidy title is listed in the rules, which set the conditions for the provided financial payments in the form of subsidies on the basis of support programs listed in the Act on Organic Agriculture 2002 No. 152/1997 Coll., § 2, article 1.

Financial subsidies granted for permanent grassland maintenance amount nowadays to 1 000 CZK per hectare. On the basis of results, we can conclude, that the maintenance of permanent grasslands is related to other support programs allocated for the support of non-production functions of agriculture and for support of activities participating in the countryside maintenance. We recommend to sustain the current level of financial support due to all the above mentioned facts and all relations.

It is possible to formulate the following initiatives for further solutions:

- support of processing facilities for processing of organic animal products
- support of the formation of sales, marketing companies securing the sale of organic products
- development of the system of individual advisory service for organic farmers
- support of the information availability needed for organic farming
- development of the system of education for organic farmers...

## CONCLUSION

The cost and profitability analysis carried out under the research project can bring valuable information for further decision-making about the ways of development of organic agriculture as one of the forms of multifunctional agriculture. Organic enterprises frequently use support programs for support of non-production functions of agriculture and for support of the activities par-

ticipating in the countryside maintenance. Organic farmers especially use the support programs allocated for the maintenance of permanent grasslands on agricultural land and support programs allocated for partial coverage of loss caused by operating in the organic system of farming, or operating in the period of conversion. Concurrently, there is also used the support program for technological or organizational safeguarding of pastures for farm animals on agricultural land. Farmers dealing also with animal husbandry use the support program Beef Cattle Management, where the subject of support is the born calf. It is evident from the summary of the cost and profitability analysis of organic enterprises, that further improvement of the financial, non-financial supports and measures is essentially necessary for further development of organic agriculture.

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