SCIENTIFIC INFORMATION

Labour productivity comparison of milking worker's operation between German and Czech farms

Porovnání produktivity práce pracovníka při operaci dojení na německých a českých farmách

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INTRODUCTION

Czech agriculture is accompanied by a continuous performance growth (production, machinery). The result of this growth is the decline of the agricultural workers number, which is accompanied by labour productivity increase. This trend can be mentioned in all developed countries.

Productivity is a source of all economic value. There are mostly matched four crucial resources: time, capital, material activity, knowledge as a base of economic value growth. Their usage shall be consistently and thoroughly managed from the productivity point of view. Each group of resources has to be managed separately and in a different way with mutual co-ordination in the framework of the existing system. Beside increase of productivity (profitability) of capital (financial resources), it is necessary to increase live labour productivity (human) when using production means (assets) and in particular human knowledge in the optimal way. On these bases, there could be established even correct business strategy, which should respect time savings, costs decrease and production quality rises. Such a strategy leads through productivity increase to assuring the future business existence.

Labour productivity is, in general, expressed by the ratio, where the product (production) is measured with the volume of consumed work. Volume of production and consumed work can be measured by different ways in accordance with the level of the followed indicator. Worker production or production in connection with time unit is the most frequently followed on the corporate level.

Worker's labour productivity in working process shall be understood as the effectiveness of the given human potential utilisation in working process at the expected conditions (working time duration, human physical and psychical abilities, working conditions, etc.).

New technology establishment, used technologies and work organisation improvement have a significant influence on labour productivity increase in the agricultural sector. In particular, working method, labour intensity and utilisation of working time (which create the basis of working processes organisation) could be assumed as the elements influencing the level of labour productivity. These elements are hardly mutually comparable, however, they can significantly influence the result of worker's labour productivity. We are unable to reach good productivity result when using incorrect working method (working procedure, etc.) even if there is high working intensity and high working time utilisation.

OBJECTIVES

This contribution objective is worker's milking operation labour productivity comparison on the basis of time norms and results of live work time consumption analysis comparison in Germany and the Czech Republic. Basic measures for comparison of labour productivity are time use and working procedure.

MATERIAL AND METHODOLOGY

Results of measuring the live work time consumption on milking operation at the family farm of Mr. Partoschek in the area of Hessen in Germany were starting information for comparing the labor productivity. There were used data from the collection of norms for the Czech Republic, elaborated by the Department of Agricultural Marketing and Management of the Faculty of Economics and management of the Czech University of Agriculture in Prague.

Data about live work time consumption on milking operation were acquired on the basis of five time surveys of working operation. There was used a digital seconds counter. When performing the time measurements, there was also viewed the level of work organisation – working procedure, location of control elements, etc. There were used statistical methods in purpose of the measured data evaluation and the results were elaborated in forms of tables. The resultant values were consequently compared with data from the collection of time norms for animal production.

RESULTS AND DISCUSSION

Primary data for comparing labour productivity were acquired through measurement at the farm of Mr. Partoschek. The family farm operates the area of 85 ha and the structure of agricultural area is accommodated to milk production. There are 85 heads of the Holstein Black-brindled milk-cows. The average performance per one dairy cow is 8 000 l of milk per year (lactation). Dairy cows are housed in the stable, which includes the area for milk house of the type Westfalie MA 2 x 5, PPS 1 200 l/min. – herringbone arrangement. The technological performance is recorded to be 55–60 heads of dairy cows per hour. Milking is performed twice a day. In average, there are milked 55 heads of dairy cows. One milking corresponds to 705 l of milk. Milking operation is performed by the farm owner with the help of his wife.

There were elaborated synthetic results from the time surveys analysis results. They are mentioned in Table 1. The resulting times are recalculated at basic unit (one dairy cow).

The data mentioned in the table imply that the crucial live work time consumption is dedicated to the group of activities, which concern milking, i.e. 64.84%, which means 1.247 min/head*milking. Crucial time consumption in the milking group of activities is dedicated to the following activities:

– spraying + washing udder 0.360 min/head*milking, i.e. 28.85%
– machinery milking 0.255 min/head*milking, i.e. 20.45%
– setting teatcups on 0.221 min/head*milking, i.e. 17.71%

The following groups of activities are dedicated to other regular and irregular activities, which are realised when milking takes place:

– driving dairy cows to and away from milking house 0.082min/head*milking, i.e. 4.28%
– other work when milking 0.114 min/head*milking, i.e. 5.97%

The above-mentioned groups of activities could be assumed to form the basic file of working procedure when milking in the herringbone-milking house (except the activities, which are connected with preparation of milk for calves and interview). If we compare the doserved data with the time norm mentioned in the collection of time norms for the mentioned milking house types, we find the following results:

– measured time consumption for activities creating working procedure, when milking 1.443 min/head*milking
– time norm for the herringbone milking houses (Westfalia, DZD 2x5, Agromilk) 1.200 min/head*milking resp. 1.00 min.

It results from the comparison that the measurement results show a higher time consumption than the time norm. The reasons could be seen in the fact that the performance of dairy cows at the farm is higher than the average performance in Czech conditions. Also some activities as teats disinfections after milking and machinery milking were realised very accurately. If we eliminate two activities (which are mentioned above and are not directly connected with milking), then the resultant time consumption is 1.366 min/head*milking. Dairy cows' presence duration in the milking house ranged from 10 to 12 minutes. Measurement results correspond with the hourly milker performance – 44 heads. The hourly performance in the time norms collection is 50–60 heads. The producer of the milking house type also mentions such performance.

As far as the preparation and cleaning of the milking house is concerned, the results in advance and after milking are the following:

– measured time consumption 24.221 min/head*milking
– time norm 43.000 min/head*milking

The difference, which benefits the followed milking house by 18.779 minutes, is predominantly given by the more adequate technological state and milking house arrangement – there are not installed the "driving corridors". Dairy cows come directly from the stable to the milking house.

Consumption of the working time on milking operation was acquired from the results of the selected sample in German agriculture,which are as follows:

– Consumption of work time on milking 0.749 min/head*milking
  – preparation of udder 0.367 min/head*milking
  – setting teatcups on 0.333 min/head*milking
  – machinery milking 0.033 min/head*milking
  – taking teatcups off 0.008 min./head*milking
  – control of udder 0.008 min/head*milking
– Consumption of time on other operations 0.701 min/head*milking
  – driving dairy cows to and away 0.285 min/head*milking
  – defect 0.017 min/head*milking
  – waiting 0.333 min/head*milking
  – special works 0.066 min /head*milking
– Total time consumption 1.450 min/head*milking

Comparison of this data with the collections of norms for the Czech Republic, elaborated by the Department of Agricultural Marketing and Management of the Faculty of Economics and Management, shows that in our conditions the consumption of working time is by 0.25 min per head*milking shorter.

In this case, there is reached a higher labour productivity of worker time in the surveys bases comparison in Czech conditions. It has to be noted that the difference is not significant. If we recalculate it in accordance with the performance, we reach the opposite results. Time consumption per 100 litres of milk was 9.757 minutes at the followed farm. Time consumption per 100 litres of milk was in Czech conditions, at 6 000 litres average performance and the mentioned time norm, 11.42 minutes. Then the difference in worker's labour productivity in milking

Table 1. Results of live work time consumption

Activity when milking	Measured time (minutes/shift)	Number of units/milking		Time consumption (minutes)		Share (%)
		pieces	appearance	pieces	appearance	
1. Personal worker preparation	2.180	55		0.039	x	2.05
– before milking	1.030	55	1	0.018	1.030	
– after milking	0.150	55	1	0.021	1.150	
2. Driving dairy cows to and away, when milking	4.535	55	–	0.082	x	4.28
– driving diary cows to milk house	2.390	55	111	0.043	0.217	
– driving dairy cows away from milk house	2.145	55	11	0.039	0.195	
3. Milking	68.622	55	–	1.247	–	64.82
– spraying udder	2.750	55	5	0.050	0.550	
– spraying + washing udder	19.800	55	55	0.360	0.360	
– changing over when washing udder	0.102	55	8	0.002	0.002	
– setting teatcups on	12.155	55	55	0.221	0.221	
– milking control	12.135	55	23	0.220	0.527	
– machinery milking	14.035	55	55	0.255	0.561	
– teats disinfections	7.645	55	55	0.139	0.139	
4. Other work when milking	6.315	55	–	0.114	–	5.97
– raking of excrements	0.495	55	7	0.009	0.070	
– veterinary attendance	1.045	55	2	0.019	0.522	
– preparing milk for calf breeding	3.300	55	1	0.060	3.300	
– spraying floor in milkhouse	0.495	55	5	0.009	0.099	
– interview	0.980	55	4	0.017	0.245	
5. Milkhouse preparation and cleaning	24.221	55	–	0.440	–	22.88
– preparation work before milking (setting on a filter)	9.050	55	1	0.164	9.050	
– washing milkhouse	10.330	55	1	0.187	10.330	
– demounting filter in milk store room	0.656	55	1	0.012	0.656	
– hanging up teatcups	2.860	55	10	0.052	0.286	
– putting the milkhouse on and off	1.050	55	2	0.019	0.525	
– preparation of disinfection solution	0.275	55	1	0.005	0.275	
6. Total time consumption	105.873	x	–	1.925	–	100.00

is 1.66 minutes, i.e. a lower labour productivity by 17%. It has to be emphasised that some working activities (teats disinfection, washing udder, etc.) were accurately followed at the farm.

Time is a significant measure when evaluating worker's working activity. It has to be underlined that the time needed to perform a particular working operation could be different – workers reach different times when using the same working method and using the same working time and at the same working conditions . Human performance dispersion is known even in other industries, e.g. in sport. This dispersion in working conditions ranges in rate 1 : 1.5 to 1 : 2. There are known cases from practice, where this dispersion could be as much as 1 : 5–6. If we want to compare and to state labour productivity, we have to watch, next to working method and time consumption, also the performance parameter.

This parameter stating is the last data, where we can compare the watched object – workers mutually. With regard to this purpose, we have to state a limit, which shall

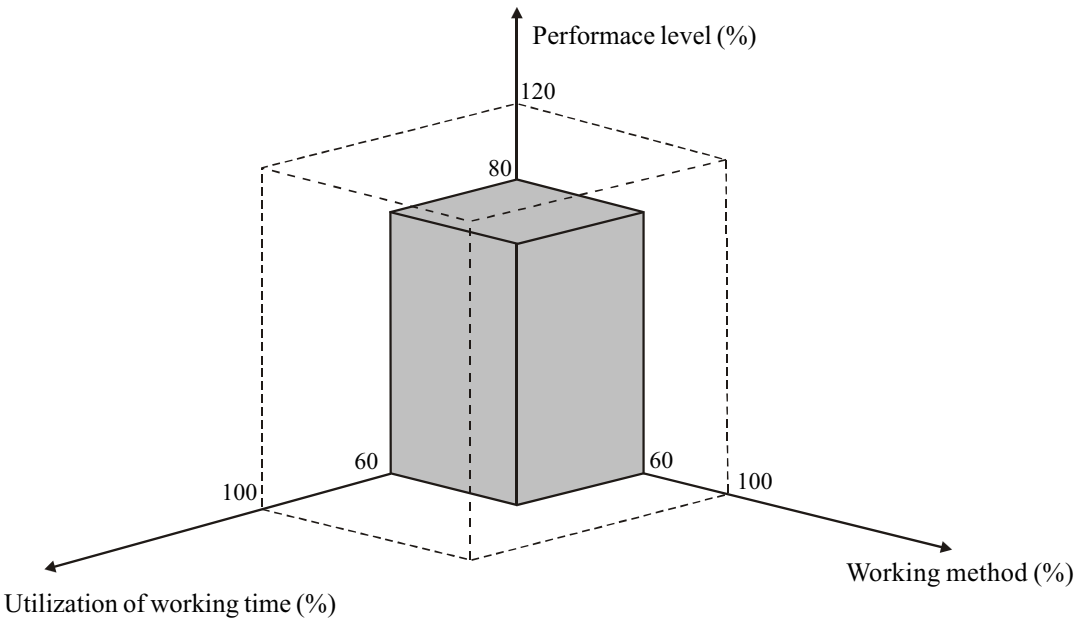

Figure 1. Prism of productivity

be the base for the comparison and which would meet the value of prescribed performance, which is connected with the working activity value. This performance could be marked as the related performance – which corresponds with the kinetic and tonic continuance, stated by working method at the normative time. The related performance could be also expressed in labour productivity units, for e.g. number of heads/time.

The real performance of the followed worker corresponds with the kinetic and tonic continuance stated by the working method. It could be expressed in units of labour productivity. The rate of real and related performance expresses the performance level of the watched worker.

The performance level could be expressed in the form of rate like an invariable or percentual expression. Then the value of performance level, which is lower than 100%, resp. higher than 100% expresses the lower, resp. higher real worker performance than the related performance. There can be used a three-dimensional model of labour productivity evaluation, which could be marked as "Productivity Prism" for better understanding of the labour productivity evaluation.

Productivity prism expresses the resultant reflection of labour productivity without loosing information on particular elements values (see Figure 1).

CONCLUSION

The contribution is focused on labour productivity comparison of milking worker's operation. The labour productivity is measured by time consumption on one cow milking or worker's hourly production. There were used the results of live work time consumption measurement at a family farm in Germany as the base of observation. There were used time norms from the collection of norms elaborated by the Department of Agricultural Marketing and Management of the Faculty of Economics and Management of the Czech University of Agriculture in Prague as a comparison base in Czech conditions. We can assume, in accordance with the comparison results, that there are no considerable differences in the level of labour productivity measured by time consumption on one dairy cow between the mentioned German farm and Czech conditions. Lower time consumption by about 0.166 min./head*shift resp. by about 5 heads higher hourly performance is recorded in Czech conditions. On this base, we can deduce a higher labour productivity in Czech conditions (only from the time consumption per head viewpoint). For more objective results, we should perform more measures at farms in Germany.

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