

THE INFLUENCE OF FEED RATION STRUCTURE ON COSTS IN CATTLE RAISING

UTJECAJ STRUKTURE KRMNOG OBROKA NA TROŠKOVE U GOVEDARSTVU

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ABSTRACT

Relative purchasing values of roughage were calculated for the 1990-1994 period by taking into consideration the prices of nutrients in concentrates (least squares method) and, using models, five structurally different feed rations for dairy cows were evaluated. The results have shown that in spite of great price fluctuations of concentrates the nutrients in roughage were relatively less expensive than those in concentrates. Considering the existing price relationships the production price of milk was the lowest if cows were fed grazing followed by rations with maize and grass silage and concentrates; milk was the most expensive when poor quality hay was fed.

INTRODUCTION

Forage costs represent 40 to 65% of overall production costs in cattle raising. Production intensity and also the related economic efficiency of raising depend to the greatest extent on feed ration.

In Slovenia two thirds of all agricultural land are covered by grassland which can be most efficiently exploited only by raising ruminants, primarily cattle. Under such conditions efforts of covering as large share of forage requirements as possible with roughage are easy to be understood. Such a concept of raising will be economically efficient only if roughage was cheaper than (imported) concentrates which in Slovenia usually have to be purchased.

The purpose of this contribution is to explain the relationships between production costs of roughage and prices of concentrates and to assess the influence of different structures of feed ration on total costs of milk production.

EVALUATION OF ECONOMIC EFFICIENCY OF ROUGHAGE PRODUCTION

The basic problem of measuring the economic efficiency of roughage production comes from the fact that roughage as a rule is not a market product and as such it has no market price which is usually used to express the value of production output. Therefore, the following question arises: with what to compare the production costs (input) or how to render possible the mutual comparison of different kinds of roughage. The simplest common denominator and also the most widely used in practice is the dry matter concentration in roughage. Also, the yield is often expressed in starch equivalent. However, all these criteria account for only a part of common output, therefore, as an economic efficiency indica-

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tor, they cannot be considered as the most adequate.

The most widely used method among the agrarian economists in Slovenia is the taxation method for the calculation of relative purchasing value (RPV). RPV of roughage means the evaluation of energy and protein concentration in roughage according to prices valid for purchased concentrates. The price of energy and protein unit is calculated from data on nutrient content and prices of several types of concentrates using the least squares method. In case of roughage production costs formation on the RPV level, from the point of view of nutrient prices, they would be indifferent as far as the inclusion of roughage or purchased concentrates in feed ration is concerned. If the production price of roughage is lower than its RPV the nutrients in roughage are less expensive than those in concentrates and vice versa. The RPV level means the upper limit of rational inclusion of roughage in feed ration.

The so-called price index (PI) of various types of roughage is used for their mutual price comparison.

$$PI = \frac{PP}{RPV} \times 100$$

PP = production price of chosen roughage
RPV = relative purchasing value of chosen roughage

The price index explains how much does the unit of nutritive value in roughage relatively cost in comparison with the price of nutritive value in concentrates. Lower price index results in relatively lower production cost of nutrients in concentrates.

For the calculation of price of energy and protein unit (taxation criterion) the following concentrates were used:

	DM (%)	SE (%)	DCP (%)
Maize - kukuruz	87,0	81,0	7,5
Barley - ječam	86,0	71,0	8,0
Sunflower meal - sunčokret sačma	90,0	41,8	25,8
Soy-bean meal - sojina sačma	89,0	72,4	43,7
Dried sugar beat pulp - sušeni repini rezanci	90,0	50,9	4,9
Complete concentrate for dairy cows - kompletni koncentrat za muzne krave	90,0	70,0	12,0

The prices of chosen concentrates were taken from data gathered by the Slovene Bureau of Statistics following the quarters of the year for the 1990-1994 period.

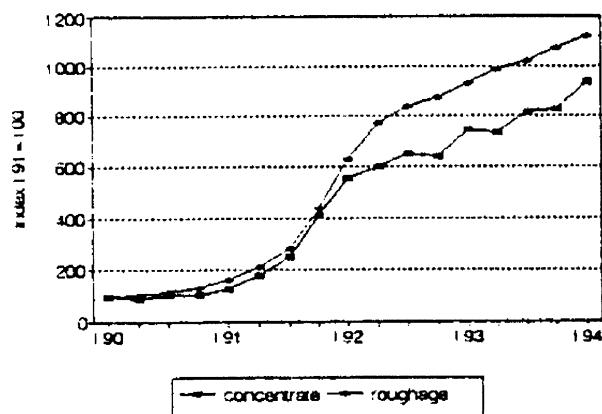
Relative purchasing values were calculated for the following types and qualities of roughage:

	DM (%)	SE (%)	DCP (%)
Hay 2 - sijeno 2	86	27,2	4,3
Hay 4 - sijeno 4	86	41,3	9,9
Grass silage - travna silaža	35	18,0	3,9
Grass - trava	20	12,0	2,2
Grazing - paša	17	10,5	2,8
Maize silage - kukuruzna silaša	30	18,5	1,4

The production costs of roughage (production prices) were taken from model calculations otherwise used for monthly evaluation of production costs in cattle raising and were calculated according to quarterly periods.

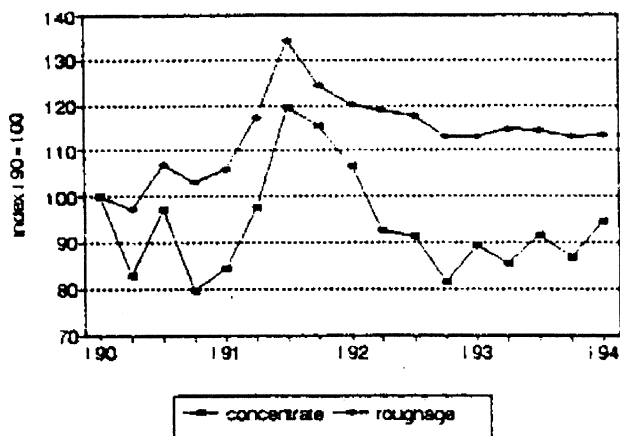
PRICE MOVEMENTS OF CONCENTRATES AND PRODUCTION COSTS MOVEMENTS OF ROUGHAGE IN THE 1990-1994 PERIOD

The price index of roughage depends on purchasing prices of concentrates on one side and on costs of production and content of nutrients in roughage on the other. In the Slovene conditions both prices and price relationships keep changing permanently.



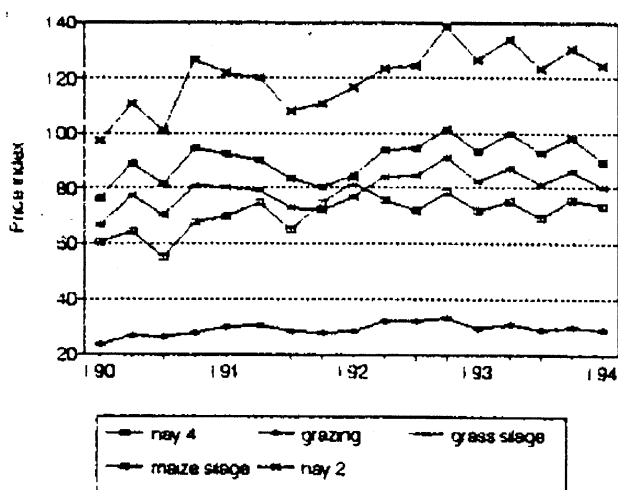
Graph 1. Price and cost movements of concentrates and roughage

Grafikon 1. Cijena i kretanje cijene koštanja koncentrata i krme

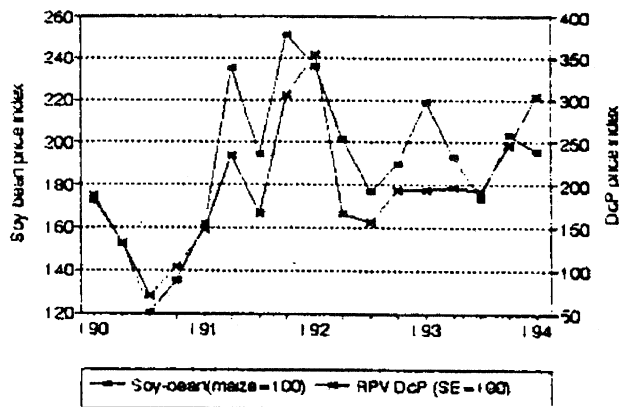


Graph 2. Price and cost movements of concentrates and roughage- deflationary
 Grafikon 2. Cijena i kretanje cijene koštanja koncentrata i krme - protuinflacijski

The prices of concentrates in the observed period were increasing nominally under the influence of inflation while a stronger real price rise (with regard to retail price rise) was recorded in the second half of the year 1991 and in the first quarter of the year 1992. Similar movement though a more steady one was also observed for production costs of roughage. However, it is obvious that the growth of production costs of roughage was practically all the time stronger than the growth of concentrate prices. In the observed period roughage went relatively up in price in comparison with concentrates.



Graph 3. Price index of roughage
 Grafikon 3. Index cijene krme



Graph 4. Relative prices of soy-bean meal (maize=100) and RPV DcP (RPV SE=100)
 Grafikon 4. Relativne cijene sojine sačme (kukuruz=100) i RPV DcP (RPV SE=100)

Such a finding was also confirmed by price indexes for roughage. As it can be seen from Graph 3 a slight growing tendency of price index was noticed in all types of roughage with the exception of a shorter period observed in the year 1991 and at the beginning of 1992. In spite of all this the results have shown that nutrients in roughage were still less expensive than those in concentrates, i.e. the more direct is their use the cheaper they get. Thus nutrients obtained at grazing (PI from 24 to 34) were by far the cheapest followed by grass (PI from 46 to 65), grass silage (PI from 67 to 92) and maize silage (PI from 55 to 82) while at present price relationships nutrients in hay were less expensive than those in roughage only if hay had high enough quality (PI from 76 to 102). Nutrients in poor quality hay were as a rule more expensive than those in concentrates (PI from 97 to 139).

While the price relationships between particular types of grassland forage did not change essentially the movement of price index of maize silage deviated a little over particular periods. PI was significantly influenced by the relation between energy price and protein price which had significantly changed in the observed period (Graph 4). In the periods in which the relation was strongly extended in favor of protein (2nd and 4th quarter of the year 1991, 1st quarter of 1992) maize silage went relatively up in price on account of low protein content while the grassland forage became less expensive and vice versa. Maize silage was the least expensive in the 2nd quarter of 1990 when protein price was even lower than energy price.

THE INFLUENCE OF FEED RATION STRUCTURE ON MILK PRODUCTION COSTS

The greatest advantage of price index lies in the fact that it can be used as a basis for the conclusion on the height of costs of feed ration. The latter will be less expensive the lower the price index of basic roughage is and vice versa. In order to quantify the above statement the production costs for feed rations containing various types of basic roughage and different share of concentrates were calculated. Feed rations were calculated for cows with 5.000 litres of milk production per year.

As it can be seen from the table the cheapest milk was that of the grazing ration (PI of grazing = 29). All the remaining feed rations were essentially more expensive and they followed each other according to the growth of price index of basic forage. This rule applied only if the consumption of basic roughage was high enough. The ration with relatively small consumption of maize silage was more expensive than that with high consumption of grass silage in spite of the fact that the price index of maize silage was lower than that of grass silage. Feed ration with poor quality hay was the most expensive and it was more expensive than it would be if it had been (hypothetically) made up of concentrates only.

CONCLUSION

The low price of roughage is of extreme importance for the economy of cattle raising. Due to different properties of particular roughage types the economic efficiency of production cannot be concluded upon just on the basis of production costs. Relative purchasing value and the price index derived from it represent an adequate efficiency indicator of roughage production.

The existence of clear connection between price index of basic roughage and feed ration costs was shown. The lower was the price index of basic roughage the cheaper was the feed ration and vice versa.

SOURCES

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3. *** Nabavne cene reprodukcijskega materiala, sredstev za delo in storitev za kmetijstvo. Zavod RS za statistiko (podatki za obdobje 1990-1994)

An overview of structure of shosen feed rations and production costs (estimate for the first quarter of the year 1994)

Basic forage - osnovni obrok	Feed rations (kg/day) - krmni obrok (kg/dan)				
	Grazing - paša	Maize sil. - kuk. sil.	Grass sil. - travna sil.	Hay 2 - sijeno 2	Maize sil. - kuk. sil.
Grazing paša	55	-	-	-	-
Grass silage travna silaža	-	-	26	-	-
Hay 4 - sijeno 4	3	3	3	-	3
Hay 2 - sijeno 2	-	-	-	11	-
Maize silage - kukuruzna silaža	-	25	-	-	12
Maize - kukuruz	2	1,5	3	5,5	5
Soy bean meal - sojina sačma	-	1,8	-	1,2	1,5
Forage costs /SIT/l) - cijena koštanja hrane (SIT/l)	12,2	20,9	22,1	25,8	22,3
Share of conc. costs (%) - Udio koštanja koncentrata (%)	31,1	43,2	25,7	56,4	65,5
Index: ration grazing=100 - Index: udio paše=100	100	171	182	200	183
Milk production price (SIT/l) - Cijena koštanja proizvodnje mlijeka (SIT/l)	27,3	36,5	37,7	41,1	38,0
Index: ration grazing=100 - Index: udio paše=100	100	134	138	151	140
PI of basic roughage - PI osnovne krme	29	74	80	125	74

SAŽETAK

Kalkulirano je relativno podizanje vrijednosti zelene mase za vrijeme od 1990. do 1994. upotrebom razmatranja cijena nutrijenata u koncentratima (least squares method) i upotrebom modela pet strukturalnih razlika hrane za muzne krave. Rezultati su pokazali da usprkos visoke cijene fluktuirajućih hranjivih tvari koncentrata u zelenoj masi su relativno manji troškovi od onih u koncentratima. S obzirom da postoji odnos cijene proizvodnje to je proizvodna cijena mlijeka manja ako su krave hranjene na pašnjacima praćeno obrocima s kukuruzom i travnom silažom i koncentratima; mlijeko je mnogo skuplje kada su krave hranjene lošom kakvoćom hrane.

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