ФАКУЛТЕТ ЗА ЗЕМЈОДЕЛСКИ НАУКИ И ХРАНА

CHALLENGE OF MACEDONIAN COW'S MILK SECTOR FACING THE EU MILK MARKET

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Introduction

- Macedonian agricultural products are facing the challenge of reaching the high quality standards required on EU markets as a prerequisite for future competitiveness on the global EU market, once Macedonia becomes a member of EU and of integrated EU market.

- One of such products, very important for the Macedonian agricultural sector and very precisely fine tuned in EU is milk.

- Macedonian milk industry, especially the primary production (farming), is pressed by the high quality and hygienic requirements and quality based pricing as a base for reaching better quality and hygiene, and strategic goals of maintaining the domestic milk production on existing level, even with a dairy farm structure that is far from optimal compared to the EU

Milk production in R. Macedonia

Value of the milk production and share in the agricultural sector

	2001	2002	2003	2004	2005	2006	2007	2008	2009
Total value of the agricultural production (000 MKD)	48 822	48 692	57 194	61 055	62 115	66 005	65 539	78 061	69 543
The value of the milk production (000 MKD)	4 417	4 304	4 336	4 487	5 765	6 325	8 021	13 251	8 960
Share of the milk production (%)	9,05	8,84	7,58	7,35	9,28	9,58	12,24	16,98	12,88

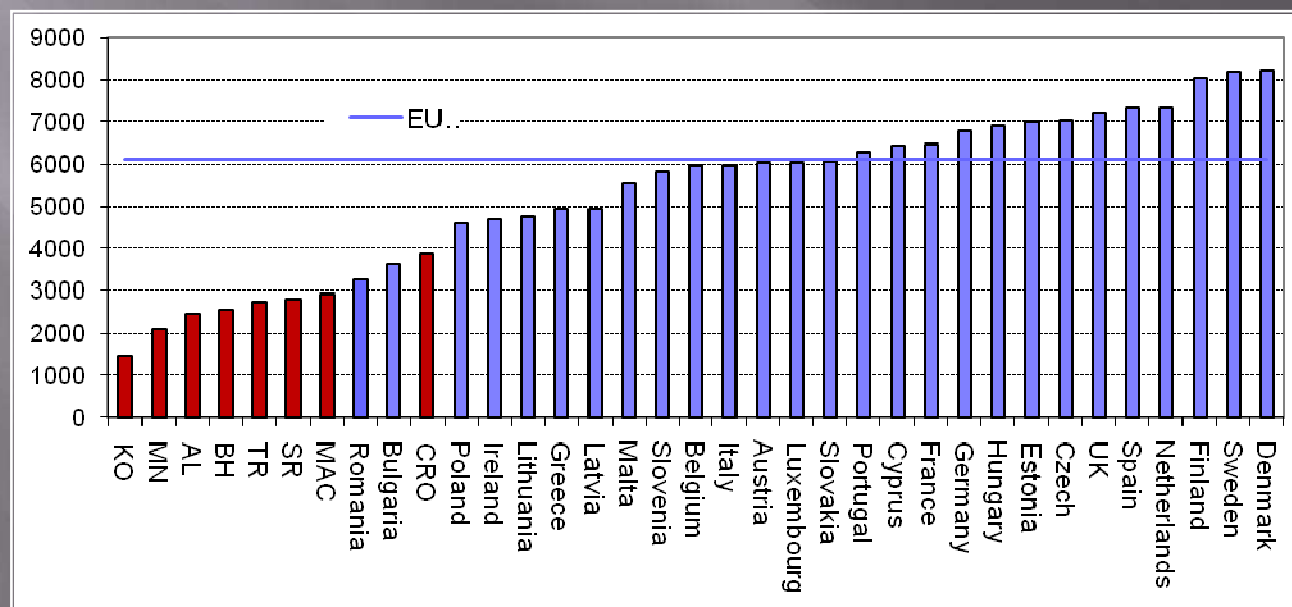Milk production in Macedonia in the period 2006-2010

	2006	2007	2008	2009	2010
Total milk production ('000 liters)	291 290	438 168	438 069	394 942	394 334
Total cow's milk production ('000 liters)	234 708	373 706	368 217	342 622	347 103
Yield / milking cow (liters)	2 497	2 880	2 895	3 004	2 787
Total sheep milk production ('000 liters)	56 582	35 473	38 296	32 934	32 157
Yield / milking ewe (liters)	64	66	68	69	60
Other milk ('000 liters)	0	28 989	31 556	19 386	15 074

Milk production in R. Macedonia

Production of cow's milk in Macedonia in 2010

	Total	Big farms	Small farms
Number of milking cows	124 553	3 620	120 933
Average per milking cow (liters)	2 787	4 930	2 723
Milk production ('000 liters)	347 103	17 848	329 255
Productivity index 2010/2009	103,3	89,7	102
Productivity index 2009/2008	93,0	95,5	92,9

Milk production /cow in the region in 2008

Macedonian cow's milk market demand and supply

Macedonian cow's milk market supply and demand in the period 2001-2008 (in tons)

	2001	2002	2003	2004	2005	2006	2007	2008
Production	200 904	198 431	191 533	212 898	197 464	234 708	385 290	369 217
Import	3 104	3 354	4 546	5 779	9 175	12 046	9 397	9 927
Total supply	204 008	201 785	196 079	218 677	206 639	246 754	394 687	379 144
Domestic consumpt.	202 989	199 841	192 422	216 172	198 710	243 997	394 412	376 003
Export	1 019	1 944	3 657	2 505	7 929	2 757	275	3 141
Total demand	204 008	201 785	196 079	218 677	206 639	246 754	394 687	379 144
Self sufficiency	99%	99%	100%	98%	99%	96%	98%	98%

Import and export of cow's milk in Macedonia in the period 2001-2008

	2001	2002	2003	2004	2005	2006	2007	2008
Import (t)	3 104	3 354	4 546	5 779	9 175	12 046	9 397	9 927
Import ('000 US$)	1 222	1 327	1 963	3 170	5 775	7 622	7 040	8 381
Import price (US$/kg)	0,39	0,40	0,43	0,55	0,63	0,63	0,75	0,84
Export (t)	1 019	1 944	3 657	2 505	7 929	2 757	275	3 141
Export ('000 US$)	359	661	1 413	989	2 472	1 048	160	2 358
Export price (US$/kg)	0,35	0,34	0,39	0,39	0,31	0,38	0,58	0,75

Cow's milk and milk products consumption

Consumption of cow's milk and milk products in Macedonia in 2010

Yearly family average	Total	Purchased	From own production
Pasteurized Milk, l	94,9	73,1	21,8
UHT Milk, l	62,0	62,0	-
Yoghurt, l	52,9	52,9	-
Set Yoghurt	19,3	19,3	-
Sour cream	3,7	3,7	-
Fruit Yoghurt	0,7	0,7	-
Sweet cream	0,5	0,5	-
Cheese	29,4	26,7	2,7
Whey cheese	7,6	6,7	0,9
Hard and semi hard Cheese	1,5	1,5	-
Yellow type (Kachkaval) cheese	10,1	10,1	-
Processed cheese	1,0	1,0	-

Prices of milk and milk products in Macedonia

Raw cow's milk price in Macedonia in the period 2006-2010

	2006	2007	2008	2009	2010
Total purchased (t)	96 013	105 077	98 351	108 793	83 997
Total value ('000 MKD)	1 713 810	1 818 961	2 354 330	1 745 121	1 426 372
Average purchased price (MKD/kg)	17,8	17,3	23,9	16,0	17,0
Total quantity purchased reported (t)	80 127	89 812	83 097	92 951	70 173
Total value from reported ('000 MKD)	1 281 530	1 588 891	1 959 167	1 447 881	1 203 563
Average purchased price reported (MKD/kg)	16,0	17,7	23,6	15,6	17,2

Supermarket price movement of cow's milk in Macedonia in the period 2008-2010

	2008	2009	2010
Cow's milk MKD/liter	38,23	32,38	32,80

Prices of milk and milk products in Macedonia

Average prices movements of yellow and white cheeses in Macedonia (MKD/kg)

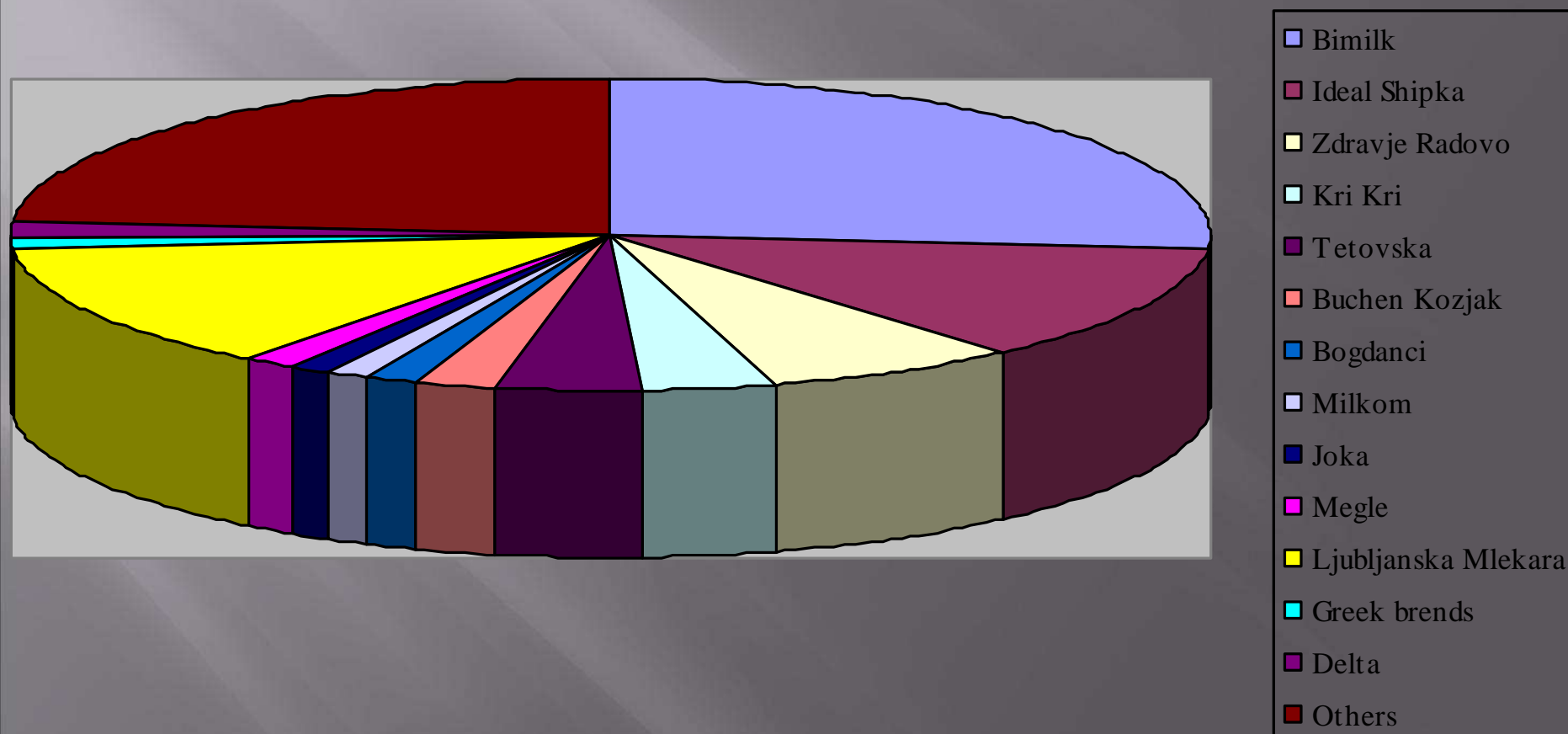| Type of cheese	2008	2009	2009/2008
Yellow kashkaval type from cow's milk	315,2	285,4	90,5
Yellow kashkaval type from mixed milk	374,4	354,8	94,8
White type from cow's milk	198,0	186,8	94,3
White type from mixed milk	237,8	229,3	96,4

Regional price movements

Movements of the average prices on production (purchase prices) on the regional markets (US$/t)

Country	2005	2006	2007	2008	2009
Bosnia and Herzegovina	315,3	311,4	350,4	483,8	394,3
Croatia	345,1	344,6	390,2	498,5	398,5
Slovenia	328,0	334,7	381,4	480,3	361,0
Macedonia	316,8	366,1	387,5	571,8	364,7

Processing plants situation

Macedonian milk and milk products market share of different brands (%)

Legend:
- Bimilk
- Ideal Shipka
- Zdravje Radovo
- Kri Kri
- Tetovska
- Buchen Kozjak
- Bogdanci
- Milkom
- Joka
- Megle
- Ljubljanska Mlekara
- Greek brends
- Delta
- Others

The milk pricing model

Macedonia is developing a model in the area of raw milk price validation, articulating the farmer-processor relations through the bylaws covering the area of quality standards and price validation of the raw milk, under the umbrella of CMO and quality standard requirements of EU.

The model should offer flexibility to the national policy in the milk sector supporting development through this price articulating model, leading the sector in to the desired political directions, higher production level, higher quality production or both, balancing between the main stake holders, farmers and milk processors.

Development a model that will offer a fair pricing of raw milk is not easy and it is a rather challenging task having strong impact on dairy farming.

The milk pricing model
GRADING

Becide the other things the bylaw defines the milk grading method and the method of validation of the raw milk.

Milk grading is according the total bacteria count (TBC) and total somatic cells count (TSC) as follows

Grade	TBC (Cfu/ml)
Extra	$\leq$ 100.000/ml
I grade	- 100.001/ml - 500.000 /ml
II grade	- 501.000/ml - 1.200.000/ml

Grade	TSC
Extra	$\leq$ 300.000/ml
I grade	$\leq$ 400.000/ml
II grade	- 401.000/ml - 600.000/ml

The lowest grade of these two is the final grade of the milk.

The milk pricing model PRICING

The value or the price of the raw milk is estimated according the following formula:

$$OCM = (M \times mc) + (P \times pc) + K$$

OCM — Basic price or Purchase price of the raw milk;
M — % of milk fat;
P — % of milk proteins;
mc — money value (price) of unit (1%) of fat;
pc — money value (price) of unit (1%) of proteins;
K — Correction factor (added value for quality grade).

In the process of determination of purchase price of the raw milk (OCM) the contribution of milk fat is 40% and milk proteins 60%.

Correction factor for quality (added value for quality grade) is:

Grade	Correction in price (%)
Extra	+ 10 %
I grade	0%
II grade	- 10 %

The milk pricing model PRICING

Estimation of raw milk purchase price

Step 1. Data for total average milk price (VPCM) of standard milk content (4,2% milk fat and 3,4% proteins) obtained. If the total average milk price of standard milk content (VPCM) is 18 MKD.

Step 2. Estimation of the money value of fat and protein unit

	Fomula for estimation	Value (MKD)
Money value of fat unit	cm = (VPCM x 0,40)/4,2	**1,71 MKD**
Money value protein unit	cp = (VPCM x 0,60)/3,4,	**3,18 MKD**

VPCV = Total average milk price based on 4,2% milk fat and 3,4% proteins
mc = money value of fat unit (40% participation in VPCM)
pc = money value of protein unit (60% participation in VPCM)

The milk pricing model
PRICING

Estimation of raw milk purchase price

Step 3. Estimation of the purchase price of the raw milk

OCM = (M x mc) + (P x pc) + K

If
M=3.8, P=3.2, Extra grade

OCM = (M   x mc)   + (P   x pc)   + K
OCM = (3.8 x 1.71) + (3.3 x 3.18) + 10%
OCM = 6.51 + 10.16   + 1.67

(OCM) Purchase price of raw milk is:
18.35 MKD

The possibilities for use of the model as a price pooling tool

The price defining model proposed in the bylaw offers flexibility in reaching the systematic goals of the policy in the milk sector through the method of determining the nominal money value of the protein and fat units in the model and therefore offers several directions in the milk pricing policy

Direction 1. Completely market definition of the price where money value of the fat and protein units are determined by the supply and demand or actually buyers or processors according their needs for price and quality of the raw milk that is the main input in their production process of processing and for this to take place, the farmers has to agree on these offered price

Direction 2. Programmed contribution of the policy in the price definition through definition of target price that will help implementation of predefined policies for the milk sector

The possibilities for use of the model as a price pooling tool

Direction **2.** Programmed contribution of the policy in the price definition through definition of target price that will help implementation of predefined policies for the milk sector

Policy 1: Stimulation of milk farm production where money value of the fat and protein units are determined by the predefined policies on a higher level leading to a higher purchase price for raw milk, satisfying the needs of the farmers and at the same time balancing the needs of the buyers/processors through a programs for predefined financial support that will counter balance the profit looses due to higher input prices of the raw milk in the processing process.

The possibilities for use of the model as a price pooling tool

Direction 2. Programmed contribution of the policy in the price definition through definition of target price that will help implementation of predefined policies for the milk sector

Policy 2: Stimulation of milk processing where money value of the fat and protein units are determined by the predefined policies on a lower level leading to a lower purchase price for raw milk, satisfying the needs of the processors and at the same time balancing the needs of the farmers through a programs for predefined financial support that will counter balance the profit looses due to lower sells prices of the raw milk and lower incomes for the farmers.

The possibilities for use of the model as a price pooling tool

Direction **2.** Programmed contribution of the policy in the price definition through definition of target price that will help implementation of predefined policies for the milk sector

Policy 3: Progressively balanced financial support for noticeable increase of production and improving the quality of the raw milk on the farm level where money value of the fat and protein units are determined by the predefined policies on the realistic or market level but in order to stimulate increased production (quantity) and increased quality, the policy makers define the financial support on the level of certain percent increase (for example 20%) of the money value of the fat or protein units (mc + (mc x 20%)) and (pc + (pc x 20%)) that lead to increased financial support to the farmers that produce higher quantities of better quality raw milk. Balances for the processors are not essentially needed because they receive purchase high quality raw milk (their input) on optimal or market price and realize sufficient profit due to these optimal or market prices therefore lower input costs in the production due to these market prices of the raw milk

Conclusions

• Quality based model for pricing of the raw milk offers enough flexibility for development of proper policy according the general goals of the government in collaboration with the milk sector stakeholders.

• Model bring pooling and pushing effects for the farmers to adopt the farm management and technology to produce better raw milk quality that is needed by the milk processing industry.

• Policy makers can lead the milk sector in the desired direction just by small changes in the money valuation of the protein and fat units therefore fine tune the market very fast and without big disturbances.

• It is expected that the payment system model will lead to the improvement of the average raw milk quality on the Macedonian market but only if the policy makers use it properly, finding a proper balance and use the model as efficient tool. The only prerequisite of this fine mechanism is good and reliable database and well organized vertical and horizontal structure of the industry