

## **Income effects of by-product economic values for slaughtered cattle and sheep**

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**Abstract:** In this study, it is aimed to investigate the economic values of by-products obtained as a result of slaughter and to determine of these values within the purchase of carcass for slaughtered cattle-buffalo and lamb-sheep. Cutting records for the years 2007 and 2008 of a slaughterhouse pertaining to the private sector and the weight and price data concerning the carcass and by-products obtained from the slaughtered cattle-buffalo and the lamb-sheep constitute the material of the study. The average by-product income obtained from a carcass for 2007 and 2008 has been calculated respectively as 117.91 TL and 141.23 TL for cows; 189.59 TL and 237.08 TL for calves-bullocks; 125.31 TL and 173.88 TL for heifers; 107.41 TL and 146.35 TL for buffalos; 14.00 TL and 17.00 TL for lambs; 14.00 TL and 16.00 TL for sheep. Additionally, the share of average incomes of by-products in the average purchase price per carcass has been determined for 2007 and 2008 respectively as 7.30% and 7.78% for cows, 7.86% and 8.24% for calves-bullocks, 7.93% and 8.57% for heifers; 8.08% and 7.67% for buffalos; 11.71% and 13.02% for lambs; 10.15% and 9.56% for sheep. Besides, for the research period the rate of total monetary value of destroyed by-products within the total by-product income has been calculated as average 0.96% for lamb-sheep and 0.89% for cattle-buffalo. Finally, together with the increasing density of slaughter of the industrial meat enterprises in Turkey and as a result of their being operated with efficient and high-capacity utilization, for all species of slaughtered animals, also the possibility of collecting, processing and evaluating economically of all kinds of edible and inedible animal by-products shall be ensured. In the study, it has been determined that a substantial part of the amount the enterprises have paid for the carcass purchase has been obtained as the by-product income.

**Keywords:** Animal by-product, By-product income, Economic loss, Meat industry, Carcass

### **Introduction**

Animal by-products, along with their consumptions as food directly, are the products processed and evaluated in various ways for human utilization and also constitute an important economic income source for the national economy and livestock enterprises (1,2).

The edibility of the animal by-products differentiates according to the nutritional habits, traditions, religious beliefs, and cultures of the societies (3).

This research was performed to investigate the economic values of by-products obtained as a result of slaughter and to determine of these values within the purchase of carcass for slaughtered cattle-buffalo and lamb-sheep. Within this scope, according to purchase price of carcass to what extent the sales incomes concerning the by-products of slaughtered animals return to the enterprise was determined. In determining the purchase price of carcass in terms of industry, along with the other market factors, knowing the share of by-product income within the purchase price of carcass is a great significance.

### **Methods**

Cutting records for the years 2007 and 2008 of a slaughterhouse pertaining to the private sector and the weight and the price data concerning the carcass and the by-products obtained from slaughtered cattle-buffalo and lamb-sheep constitute the material of the study.

Within the scope of the research the data concerning carcass weights of the slaughtered animals in the slaughterhouse according to the species, gender, and age group, the purchase prices of carcass, and the sales prices of the by-products utilized and the quantities of the destroyed by-products have been collected. The monetary values of the animal products in the research have been given with the current prices of the year, in which the research has been done.

### **Results**

Table 1, Table 2, Table 3 and Table 4 are presented research findings. The average foreign exchange range rate for 2007 and 2008 are 1 US\$ = 1.30 TL.

**Table 1.** Findings concerning total and average carcass weights of the slaughtered animals and the purchase price of carcass

Animal Species	Year	Quantity (Head)	Total Carcass Weight (Kg)	Average Carcass Weight (Kg)	Average Purchase Price of Carcass (Kg/TL)	Total Purchase Price of Carcass (TL)	Average Purchase Price per Carcass (TL)
Lamb	2007	34 234	454 483	13.276	9.00	4 090 347.00	119.48
Sheep		5 532	127 176	22.989	6.00	763 056.00	137.93
Cow		6 575	1 415 005	215.210	7.50	10 612 543.13	1 614.08
Calf-Bullock		18 339	5 083 017	277.170	8.70	44 222 247.90	2 411.38
Heifer		1 424	264 795	185.952	8.50	2 250 757.50	1 580.59
Buffalo		12	2 128	177.333	7.50	15 960.00	1 330.00
Lamb	2008	12 910	171 875	13.313	9.80	1 684 375.00	130.47
Sheep		6 270	139 485	22.246	7.50	1 046 137.50	166.85
Cow		14 055	3 112 114	221.424	8.20	25 519 334.80	1 815.68
Calf-Bullock		11 405	3 282 939	287.851	10.00	32 829 390.00	2 878.51
Heifer		3 518	792 693	225.325	9.00	7 134 237.00	2 027.92
Buffalo		67	15 656	233.672	8.20	128 379.20	1 916.11

**Table 2.** Findings concerning by-products and incomes to be obtained as a result of the cutting of slaughtered lamb-sheep

Parameters		Offal (Head)	Hide (Head)	Intestine (Head)	Fat (Head)	Total (Head)	By-product Income/ Average Carcass Purchase Price (%)	
Lamb	2007	A	5.00	6.00	2.00	1.00	14.00	11.71
		B	35.71	42.86	14.29	7.14	100.00	-
	2008	A	6.00	8.00	2.00	1.00	17.00	13.02
		B	35.29	47.06	11.76	5.88	100.00	-
Sheep	2007	A	4.00	2.00	2.00	6.00	14.00	10.15
		B	28.57	17.29	14.29	42.86	100.00	-
	2008	A	5.00	3.00	2.00	6.00	16.00	9.56
		B	31.25	18.75	12.50	37.50	100.00	-

A= Average By-product Income per Carcass (TL); B= Share within Total By-product Income (%)

**Table 3.** Findings concerning some by-products and incomes to be obtained as a result of the cutting of slaughtered cattle-buffalo

Parameters		Offal (kg)*1	Hide (kg)*2	Intestines (Head)	Bones (kg)*3	Kidney Fat (kg)*4	Pelvic Fat (kg) *5	Internal Fat (kg)*6	Edible Tail Vertebra (kg)*7	Penis (pieces)	Total (Head)	By-Product Income/ Average Carcass Purchase Price (%)	
Cow	2007	A	0.28	1.50	5.25	0.09	1.60	1.60	1.60	2.00	-	-	
		B	60.26	38.74	5.25	0.36	6.40	4.80	1.60	0.50	-	117.91	7.30
		C	51.11	32.85	4.45	0.31	5.43	4.07	1.36	0.42	-	100.00	-
	2008	A	0.30	1.60	7.50	0.09	3.20	3.00	2.00	2.50	-	-	-
		B	66.43	42.51	7.50	0.36	12.80	9.00	2.00	0.63	-	141.23	7.78
		C	47.04	30.10	5.31	0.25	9.06	6.37	1.42	0.44	-	100.00	-
Calf-Bullock	2007	A	0.33	1.50	5.25	0.09	1.60	1.60	1.60	2.00	0.50	-	-
		B	91.47	62.36	5.25	0.54	16.00	6.40	6.40	0.67	0.50	189.59	7.86
		C	48.25	32.89	2.77	0.28	8.44	3.38	3.38	0.35	0.26	100.00	-
	2008	A	0.36	1.60	7.50	0.09	3.20	3.00	2.00	2.50	0.50	-	-
		B	103.6	69.08	7.50	0.54	32.00	15.00	8.00	0.83	0.50	237.08	8.24
		C	43.71	29.14	3.16	0.23	13.50	6.33	3.37	0.25	0.21	100.00	-
Heifer	2007	A	0.33	1.50	5.25	0.09	1.60	1.60	1.60	2.00	-	-	-
		B	61.36	41.83	5.25	0.36	9.60	4.80	1.60	0.50	-	125.31	7.93
		C	48.97	33.39	4.19	0.29	7.66	3.83	1.28	0.40	-	100.00	-
	2008	A	0.36	1.60	7.50	0.09	3.20	3.00	2.00	2.50	-	-	-
		B	81.12	54.08	7.50	0.36	19.02	9.00	2.00	0.63	-	173.88	8.57
		C	46.65	31.10	4.31	0.21	11.04	5.18	1.15	0.36	-	100.00	-
Buffalo	2007	A	0.28	1.00	5.25	0.09	1.60	1.60	1.60	2.00	-	-	-
		B	49.65	35.47	5.25	0.54	9.60	4.80	1.60	0.50	-	107.41	8.08
		C	46.23	33.02	4.89	0.50	8.94	4.47	1.49	0.47	-	100.00	-
	2008	A	0.30	0.80	7.50	0.09	3.20	3.00	2.00	2.50	-	-	-
		B	70.10	37.39	7.50	0.54	19.20	9.00	2.00	0.63	-	146.35	7.64
		C	47.90	25.55	5.12	0.37	13.12	6.15	1.37	0.43	-	100.00	-

A= Unit Price (TL); B= Average By-product Income Per Carcass (TL); C= Share within Total By-product Income (%); \*1= Average Carcass Weight x Unit Price; \*2= for Cow, Average Carcass Weight x 0.12 x Unit Price; for Calf-Bullock and Heifer, Average Carcass Weight x 0.15 x Unit Price; for Buffalo, Average Carcass Weight x 0.20 x Unit Price; \*3= Total Weight on all Four Limbs for Cows and Heifer, 4 kg; Calf-Bullock and Buffalo, 6 kg; \*4= Kidney Fat for Cow, 4 kg; for Calf-Bullock, 10 kg; for Heifer and Buffalo, 6 kg; \*5= Pelvic

Fat for Cow, Heifer and Buffalo, 3 kg; for Calf-Bullock, 4 kg; \*6= Internal Fat for Cow, Heifer and Buffalo, 1 kg; for Calf-Bullock, 4 kg; \*7= for Males, 1/3 kg; for Females 0.250 kg.

**Table 4.** The rate of destroyed by-products at slaughterhouses and the total by-product loss over by-product incomes (%)

Parameters		Liver	Heart	Kidney	Rumen	Intestines (Head)	Head *3	Value of Total Destroyed By-products -X (TL)	X/By-Product Income (%)	
Lamb and Sheep*1	2007	A	7.00	4.00	7.00	1.00	3.25	1.00	-	-
		B	0.500	0.150	0.200	0.700	-	-	-	-
		C	1 346	149	16	33	153	0	-	-
		D	4 711	89.40	22.40	23.10	497.25	0	5 343	0.96
	2008	A	7.00	4.00	7.00	1.00	3.25	1.00	-	-
		B	0.500	0.150	0.200	0.700	-	-	-	-
		C	415	96	26	23	383	6	-	-
		D	1 452.50	57.60	36.40	16.10	1244.75	6.00	2 813	0.96
Cattle and Buffalo*2	2007	A	6.00	3.00	2.00	0.80	5.25	2.25	-	-
		B	6.000	1.350	0.600	6.000	-	14.000	-	-
		C	802	388	310	348	1 656	124	-	-
		D	28 872	1 571.40	372.00	1 670.40	8 694.00	3 906	45 086	0.88
	2008	A	6.00	3.50	2.00	0.80	7.50	2.25	-	-
		B	6.000	1.350	0.600	6.000	-	14.000	-	-
		C	1 040	273	125	111	982	39	-	-
		D	37 440	1 289.93	150	532.80	7 365	1 228.50	48 006	0.90

A= Unit Price (Kg/TL); B= Average Weight Per Carcass (Kg); C= Quantity (Pieces); D= Total (TL); \*1= Lamb and Sheep; \*2= Cow, Calf-Bullock, Heifer and Buffalo, \*3= Head of Lamb and Sheep.

### Conclusions

The slaughterhouse performed 1.28% of the red meat production in Turkey in 2007 and 1.56% in 2008. On the other hand the slaughterhouse performed 0.68% of lamb-sheep and cattle-buffalo slaughtering in Turkey in 2007 and 0.60% in 2008 (4).

In the slaughterhouse where the research has been conducted, whilst the share of the average by-product income within the average purchase price of carcass was 10.93% for lamb-sheep and 7.79% for cattle-buffalo in average for the year 2007, it was 11.29% for lamb-sheep and 8.06% for cattle-buffalo for the year 2008. This situation asserts that the rate of by-product income to the average purchase price of carcass is higher proportionately in lamb-sheep than in the cattle-buffalo.

Finally, together with the increasing density of slaughter of the industrial meat enterprises in Turkey and as a result of their being operated with efficient and high-capacity utilization, for all species of slaughtered animals, also the possibility of collecting, processing and evaluating economically of all kinds of edible and inedible animal by-products shall be ensured. Thereby, both the income of the meat industry enterprises obtain from the animal by-products shall increase and the share of this income within the total operating income shall rise proportionately. In the study it has been determined that a substantial part of amount the enterprises have paid for the carcass purchase has been obtained as the by-product income.

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