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## ECONOMICS OF MILK PRODUCTION AND ITS DISTRIBUTION

by

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As a milk producer and distributor, I have been connected with the Gwalior Dairy Limited, Gwalior, for the last 8 years and as such I would like to present some facts and figures relating to a period of last 7 years. The facts and figures pertain specially to the cost of production and distribution of milk undertaken by the Gwalior Dairy Limited, Gwalior.

There are some factors which influence the cost of production. Briefly, they are:—

1. Locality
2. Type of cattle
3. Efficiency of cattle
4. Cost of fodder and concentrates
5. Cost of labour
6. Capital expenditure
7. Distance from the distributing centre
8. Unit of the herd
9. Incidence of the diseases
10. Veterinary charges
11. Supervision charges
12. Type of fodder on which the herd is maintained
13. Whether the cattle are stall-fed or grazed on pasture land.

### 1. *Locality*

The Gwalior Dairy Limited, Gwalior, is situated at a distance of about 5 miles from Gwalior City proper on the Agra Gwalior Metalled Road. The Dairy has got 590 acres of land where sewage water, about 20 lac gallons per day, is available in addition to a maximum supply of 5 cusics of canal water. The soil is medium. Rainfall on an average is about 30" per year. Major amount of rainfall is from 20th June to the end of September with a winter rain of about 2" in the month of December or January.

## 2. *Type of Cattle*

The dairy possesses only Sahiwal cows purchased from the Montgomery District and served by Sahiwal bulls purchased from the Indian Council of Agricultural Research, Delhi. The herd when purchased in the year 1936, mainly consisted of cows and the average yield per lactation per cow was about 1800 lbs. At present the average yield per lactation per cow comes to about 3500 lbs. There are, however, cows with the dairy which yield per lactation upto about 7000 lbs. Weaning is not practised in the herd and so the milk records do not include the milk suckled by the calves during the lactation. In addition to the cows, buffaloes from Rohtak District of Murrah breed are also kept.

## 3. *Efficiency of Cattle.*

A statement giving the number of milch cattle including both cows and buffaloes with total milk produced during different years and the average worked out per head is given below :—

Year.	Average number of milch cattle.	Milk produced (lbs.)	Average milk produced per head per year (lbs.)
1943-44 .. ..	141	2,37,630	1650
1944-45 .. ..	281	2,56,178	1823
1945-46 .. ..	130	2,92,780	2252
1946-47 .. ..	110	2,70,073	2455
1947-48 .. ..	209	2,41,917	2315
1948-49 .. ..	91	2,81,224	3090

From the above data, it would be seen that except for the first 2 years, the average milk produced per cattle per year ranged between 2000 lbs. to over 3,000 lbs., the highest being 3090 lbs. in 1948-49 due to the fact that all inefficient cows were disposed of during the year.

## 4. *Cost of fodder*

The dairy raised fodder for the cattle on its own farm. Different varieties of fodder are grown and green fodder is given throughout the year along with some dry fodder.

Jawar, maize and elephant grass are given from the 1st week of July upto the 15th of December and dry jawar (chalan) is given from 15th December onward supplemented by berseem, oats and elephant grass. On an average the fodder rates per animal come to as follows :

## Average Daily Fodder

	Dry fodder (lbs.)	Green fodder (lbs.)
Buffaloes .. ..	10	25
Buffaloe heifers .. ..	5	10
Cows .. ..	10	20
Cow heifers .. ..	5	10
Cow bulls .. ..	10	15
Buffaloe bulls .. ..	10	15

## Statement of fodder supplied yearly to Dairy Cattle

Year	No. of dairy cattle, milch cattle, heifers and buffaloes	Quantity of fodder in lbs. (stall fed)		Quantity of fodder (mds.)	
		Dry	Green	Dry	Green
1944-45 .. ..	177	3,88,800	8,73,600	4,770	10,653
1945-46 .. ..	171	5,27,425	11,15,075	6,432	13,598
1946-47 .. ..	180	5,45,675	11,47,925	6,654	13,999
1947-48 .. ..	194	5,51,150	11,53,400	6,720	14,066

## DRY FODDER

## GREEN FODDER

Year	Quantity in mds.	Rate per md.	Amount in Rs.	Quantity in mds.	Rate per md.	Amount in Rs.	Total Cost. Rs.
1944-45 ..	4,742	1/-	4,742	10653 ..	-/10/-	6,658	11,400
1945-46 ..	6,432	1/-	6,432	13598 ..	-/10/-	8,499	14,931
1946-47 ..	6,654	$\frac{1}{2}$	7,486	13999 ..	-/12/-	10,499	17,985
1947-48 ..	6,721	$\frac{1}{2}$	7,561	14065 ..	-/12/-	10,549	18,110

The fodder produced by the farm has been debited to the Dairy at the rates indicated above.

The type of fodder has a great influence on the yield of milk.

The yield of milk during the months from January to April when oats and berseem are given shows an immediate rise. The table below indicates this change for the three years from July 1946 to June 1949.

## The Gwalior Dairy Ltd., Gwalior

Milk production during the period July 1946 to June 1949.

	1946-47 lbs.	1947-48 lbs.	1948-49 lbs.
July .. .. .	25,426	16,279	20,335
August .. .. .	23,636	19,244	21,701
September .. .. .	23,249	16,855	20,387
October .. .. .	23,690	16,087	22,763
November .. .. .	20,473	13,297	20,317
December .. .. .	21,504	13,748	18,107
January .. .. .	20,556	19,463	18,714
February .. .. .	22,385	23,535	24,900
March .. .. .	25,917	29,696	28,431
April .. .. .	24,360	29,335	29,568
May .. .. .	20,437	25,262	30,952
June .. .. .	18,440	19,116	33,195
Total lbs. ..	2,70,073	2,41,917	2,86,310

5. *Cost of labour*

Charges incurred on labour are given in the statement below. They are calculated on the number of cattle.

Year.	Total number of cattle in the herd.	Total expenditure on labour (Rupees.)	Average expenditure per cattle (Rupees).
1943-44 .. .. .	235	6082 0 0	26 1 6
1944-45 .. .. .	285	6346 0 0	22 4 6
1945-46 .. .. .	306	7168 0 0	23 7 0
1946-47 .. .. .	284	6848 0 0	24 2 0
1947-48 .. .. .	253	7172 0 0	28 6 0
1948-49 .. .. .	296	12452 0 0	42 1 0

The labourers mostly belong to the locality and generally connected with the breeding of cattle. They belong to the castes of the Gwalas, Ahirs, Gadarias and Maina are employed to look after the herds. They have got an advantage over the unskilled labourers inasmuch as they are more painstaking and try to look after the cattle more efficiently and do the work quicker.

6. *Capital expenditure*

Capital investment on the herd and other items such as buildings, utensils, etc., during different years are summarised in the statement given below. The dairy buildings consist of milking sheds with floors of cement concrete and roofs of galvanised iron sheets. There are also separate courtyards for the cattle.

Year.	Expenditure on Building to date.	Expenditure on tools, implements and machinery to date	Expenditure on the purchase of herd.
1942-43.	Rupees.	Rupees.	Rupees.
Balance on 1st July 1943 .. ..			46,318 0 0
1943-44 .. .. ..			3,037 14 0
1944-45 .. .. ..			.....
1945-46 .. .. ..			3,144 0 0
1946-47 .. .. ..			653 7 6
1947-48 .. .. ..			400 0 0
1948-49 .. .. ..	14,133 0 0	3,144 3 10	20,000 0 0
Bullock carts for fodder .. ..		Number	Outlay.
Trailers .. .. ..		1	165 0 0
Tonga for milk delivery .. ..		2	1,300 0 0
Cycles for milk delivery .. ..		1	370 0 0
		3	780 0 0
		Expenditure ..	2,615 0 0

### 7. Distribution

The milk is distributed in the city on cycles and by tongas. A milk carrier on cycle carries on an average 80 lbs of milk per day. The charges on the distribution of milk per lb. for the 1948-49 were as under :—

Wages .. .. .	Rs. 2,412 0 0
Maintenance of 3 cycles including depreciation. .. ..	Rs. 230 0 0
Maintenance of tonga. .. .. .	Rs. 1,380 0 0
<b>Total</b>	<b>Rs. 4,072 0 0</b>

Total milk carried 87,000 lbs.

Cost of carriage per lb. 8.4 pies.

Cost of bulk delivery on the other hand, was as follows :—

Labour .. .. .	Rs. 540 0 0
Maintenance of 2 donkeys .. .. .	Rs. 735 0 0
	Rs. 1,275 0 0

Total milk carried 81,000 lbs.

Average cost of carriage per lb. 3 pies

### 8. Unit of the herd.

The size of the herd to a very large extent determines the cost of production of milk. The size has been rather small as fresh purchases of cows have not been resorted to and instead attention is being concen-

trated on raising herd of suitable strain through the bulls purchased from the Indian Council of Agricultural Research, Delhi. With a bigger unit the overhead charges would naturally fall.

9. *Incidence of Diseases.*

Diseases are a factor which has to be reckoned with while arriving at the cost of production of milk. In particular some diseases affect herds more often than others. Foot and mouth diseases are responsible for a great diminution in the production of Milk. It is a disease which is rather difficult to attend to. There have been attacks of foot and mouth disease during the months April to June during different years and their effect on milk production is summarised in the statement given below :—

Year.	Month of attack.	No. of cattle affected.	Fatality	Effect on yield of milk.
1944-45	June .. ..	80	30 (Mortality among milk cattle 23)	Yield went down from 19500 lbs. to 14700 lbs. per month.
1944-45	May .. ..	75	18 (Mortality among (young stock).	Yield was steady.
1946-47	April .. ..	86	13	Yield went down from 24,000 lbs to 20,000 lbs. per month.
1947-48	May .. ..	96	27	Yield was steady.

Mastities is another disease responsible for great fall in milk production. This disease badly affects the tissues of the udder and teats of the animals. The milk veins do not work and the affected teats become bloated. A good cow if not attended to properly becomes uneconomical leading to a considerable addition to the cost of production of milk. Due to mastities sometimes very good cows have to be rejected and they have to be sold at a loss.

Haemorrhage Septicemia is sometimes also responsible for great mortality annually among live-stock, specially among the buffaloes.

If epidemics amongst the cattle in a locality are controlled an improvement in the herd is possible. This is a factor which cannot be controlled by individuals. An isolation of herd is not practicable. The only method of control is resorting to veterinary aid and precautionary measures against epidemics through large scale vaccinations and adopting other preventive measures which can only be rendered possible through state aid.



10. *Charges on Veterinary and Medical Aid*

Expenditure incurred during the past few years is shown as under :

	Rupees.	Rupees per animal	Remarks.
1942-43.. .. .	288 0 0	0 11 0	
1943-44.. .. .	946 0 0	3 1 0	
1944-45.. .. .	470 0 0	1 1 0	
1945-46.. .. .	410 0 0	0 15 0	
1946-47.. .. .	1313 0 0	3 15 0	
1947-48.. .. .	722 0 0	2 1 6	
1948-49.. .. .	783 0 0	2 0 6	

11. *Concentrates.*

To develop suitable herds and to obtain good milk yields, the cattle should be given concentrates. The ration should consist of concentrates of grain, specially cereals such as gram, arhar, and oats supplemented by oil-cakes and wheat barn. During the last 4 or 5 years due to food controls it has been found very difficult to obtain concentrates at a fair price. The control authorities feel shy to allow rations for the cattle specially when a keen dearth of cereals is felt in the country. It is also true that no herd worth the name can be maintained without adequate feeds. This is a factor which is being neglected to a great extent and if not remedied, good herds are likely to deteriorate in a short period and improvement in the herd achieved after arduous work will be undone. We have not been able to obtain the full quantity of concentrates required for the cattle even at a higher price and although that would add to the cost of production of milk. The scale of concentrates ration has been considerably low as will be found from the following statement:

## Amount of grain ration per cow per day

1947-48	3 $\frac{3}{4}$ lbs.
1948-49	3 $\frac{1}{2}$ lbs.

Another important factor which influences the cost of production of milk is the way the cattle are fed. Generally where grazing lands are scanty, the method is of feeding the cattle in the stall. In this way, it is possible to control the quantity and quality of fodder to be given. It is also possible to experiment with different kinds of fodder. Good results can be achieved by adopting this method among heavy milkers. Cattle require some exercise and therefore some pasture land is essential, although their maintenance mainly on pastures, not only make them poor yielders of milk but also lead to the deterioration of the pastures. In Gwalior specially there are lots of waste lands lying fallow where even good quality grass cannot grow. Cattle are generally let loose and they roam about from morning to evening with the result that they have become

uneconomic and a mere framework of bones due to malnutrition. There are also herds in Gwalior which have never given any milk and are kept for the propagation of bullock only. On rich pastures near-about the city there are cattle which are also treated in the same manner. No expenditure is ever incurred on them. Some of these cattle yield small quantities of milk during the rainy season. The cost of production of milk by this method may be very low to the individual who owns such a herd but the system leads to national waste and should be discouraged.

### 12. Supervision Charges

The supervision staff consists of one dairy superintendent, one field man, one mate and one milk record clerk.

Supervision charges for the last 7 years are stated as under :—

1942-43	..	..	..	..	1492	15	6
1943-44	..	..	..	..	3066	1	6
1944-45	..	..	..	..	2416	2	3
1945-46	..	..	..	..	2409	10	6
1946-47	..	..	..	..	2439	0	0
1947-48	..	..	..	..	3506	0	0
1948-49	..	..	..	..	4134	0	0

### 13. Cost of Production

After calculating all the charges incurred on the production of milk, our cost of production and sale proceeds per lb. of milk during different years is worked out in the attached statement (page 169). It will be seen from the statement that the dairy section of the Company has just been able to just carry on as the cost of production and the sale proceeds practically balance each other. Sometimes, milk had to be sold at competitive rates. The milk market is controlled by the Gwalas who maintain their cattle on deleterious matter without any concentrates and can therefore afford to sell their impure and unhygienic milk at cheap rates. We have been maintaining a high standard of purity without keeping in view of the profits from dairying.

### Conclusions.

In calculating the cost of production of milk, the income that accrued from the utilization of manure has not been included as the manure has been utilised in raising green fodder which is grown on the Farm Section. The price of fodder charged to the dairy section is, besides, very low. Moreover the cattle during winter are fed on the sugar-cane raised on the farm section. No account could be kept of this item, and therefore, no

charges have been made on this account. Under supervision charges also salaries of the office staff and upper establishments have not been debited to the Dairy Section. Similarly, the income from the sale of uneconomic cattle such as calves and old bullocks, etc., which is shown as per statement given below, has not been included because the expenditure incurred on the maintenance of these cattle is born by the Farm Section of the Company.

Year.	Profit (+) or loss (-) on the sale of cattle.
1943-44 .. .. .	- 261 0 0
1944-45 .. .. .	- 312 0 0
1945-46 .. .. .	+ 144 0 0
1946-47 .. .. .	+ 1873 0 0
1947-48 .. .. .	+ 3162 0 0
1948-49 .. .. .	+ 2398 0 0

From the sale proceeds of such cattle, after making up the loss for the mortality of the herd, a fund has been created to meet the purchases which may be necessary in future either to make up the unforeseen and sudden losses due to epidemic or for making new purchases of live-stock to strengthen the herd.

One may well ask the question: If there is practically no profit, why is the dairy run at all? The dairy has an area of 590 acres attached to it on which cereals, sugar-cane and vegetables are grown. Thus, on the farming section it has been possible to make good profits. It is from this income that it has been possible to pay to the shareholders on an average of about 12½ percent dividend. In view of our own experience, we feel that it is rather difficult to conduct dairying by itself, successfully and it is only dairying and farming run jointing on a large scale and on commercial lines that dairies can make sufficient headway.

Statement showing the cost of production and sale price of a pound of milk during different years at the  
Gwalior Dairy Ltd.

Year.	Cost of Fodder.	Supervi. charges.	Labour Charges.	Distri. Charges	Expenses on Medical aid.	Depreciation Adm. and Misc. Charges.	Total Amount in Rupees.	Average sale price per lb.
	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
1943-44	0 1 8	0 0 3	0 0 4	0 0 1	0 0 .16	0 0 2.4	0 2 6.56	0 2 3.3
1944-45	0 1 2.	0 0 2.	0 0 4	0 0 1.	0 0 .33	0 0 1.1	0 1 10.43	0 2 2
1945-46	0 1 9	0 0 1.5	0 0 3.5	0 0 1	0 0 .25	0 0 1	0 2 4.35	0 2 1.1
1946-47	0 1 9	0 0 1.7	0 0 3.7	0 0 1.2	0 0 .9	0 0 3.7	0 2 8.2	0 2 8
1947-48	0 2 4.2	0 0 2.8	0 0 4.3	0 0 1.4	0 0 .6	0 0 2	0 3 3.1	0 3 6
1948-49	0 2 4.5	0 0 2.8	0 0 6.7	0 0 1.6	0 0 .53	0 0 2.1	0 3 6.23	0 3 6.2