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# **Impact of Dairy Industry on Milk Market Value and Production: A Comparative Study of Dairy Industrial and Non Industrial Regions of Sindh**

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The study focuses the issue of low market value of milk in non dairy industrial region of Sindh. The stumpy price, shrinkage production factors, profitability of farmers, employment, animal population and wastage of milk were main parameters of this cram. In this contest, it has been examined that what kind of change may occur in these parameters if the dairy industry is established. On the basis of above assumption, the questionnaire base study was conducted and data has been collected from 04 districts, 11 union councils, 200 milk producers of Hyderabad region (Non Dairy Industrial Area-(NDIA)) and 04 districts, 04 UCs and 200 milk producers of Sukkur region (Dairy Industrial Area-(DIA)) of Pakistan. It is concluded, that establishment of dairy industry in Hyderabad region will generate rural employment, increase milk production and milk market value as well as it will bring local and international investment in agro based sectors.

## 1. Introduction

Hyderabad region is located in southern part of Pakistan which mainly covers Hyderabad (rural and urban), Tando Muhammad Khan, Tando Allahyar and Matiari districts; each district is divided in sub parts known as Union Council. About 8.8 million population of the region is divided into city and rural vicinity<sup>1</sup>.

However, Sukkur region is situated on the west bank of Indus River of Pakistan, whereas, itself the Sukkur is main and third largest city of Sindh province. The major production of this region is agriculture and livestock, geographically it comprises of Pano Akil, Rani Pur, Shikarpur, Lakhi, Chak and Khanpur<sup>2</sup>. The region represents dairy industrial area and sample is taken from these all Talukas<sup>3</sup>. The nature has blessed to Pakistan with wealth of ideal buffalo and cattle breeds like Nili Ravi, Kundhi, Thari, Kankrej, Sahiwal et cetera, mainly Punjab and Sindh province are very fertile in agriculture and livestock.<sup>4</sup>

In this contest, Hyderabad region also represent a rich tradition of dairy production factors, there is also availability of labor, fodder, and vast fields which develop better environs for rearing of animals. About 75% male and female are engaged in dairy farming but the main problem is that the milk is produced and sold out in raw form .As due to changing pattern of milk consumer's market and consumer behavior raw milk has not got enough value. Therefore about 59% quantity of milk produced in rural vicinity is sold out to middleman<sup>3</sup>, as in rural vicinities production of milk is high but demand is low comparatively to city milk market.

Low price severely decrease rest of milk production factors like animals health and employment<sup>4</sup>.In contrast, it is assumed that in northern Sindh like in Sukkur region, where farmers supply raw milk to dairy industry there is less wastage of milk

production, unemployment and also availability of sound milk market comparatively to Non Dairy Industrial Area (NDA) like Hyderabad region.

Thus, this study is conducted, if the dairy industry is established in Hyderabad region then what kind of impact will occur onto dairy farmer's wellbeing, Will industry increase the milk production, decrease wastage of milk and generate employments.

## 2. Problem Statement

In non dairy industrial areas farmers face difficulty in selling and producing milk production. This phenomenon leads further shrinkage in dairy sector and its allied institutors

## 3. Research Objectives

In this contest, current study base upon following objectives:

- To examine the current animals population and milk production.
- To identify the price difference against standardized price of 40 liters of milk between Non Dairy Industrial Area (NDIA) and Dairy Industrial Area (DIA).
- To find the impact of dairy industry on milk production

## 4. Hypotheses

H1: Establishment of dairy industry support milk production factors

H2: Dairy industrial area generate more profit and employment than non dairy industrial area

## 5. Research Methodology

The survey conducted through questionnaire (August-September2012). Data was collected from Hyderabad region (Non dairy industrial area- NDIA) and Sukkur region (Dairy Industrial Area -DIA). 200 milk producers, 04 districts of Hyderabad region such as, Hyderabad (rural), Tando Muhammad Khan, Tando Allahyar and Matiari; 11 Union Councils located towards East, West and North side and from Sukkur region 04 districts,04 UCs and 200 milk producers were selected.

The reliability results of different parameters came between  $0.85 \pm 0.71$ . Then randomly questionnaire was distributed among targeted sampling area. Before analysis, the raw data was arranged into tabulation form to get the meaning full result. Milk production is measured in million (tons), the price difference of milk is measured against standardized wholesale price of 40 liters of milk which is Rs2435, value of milk was measured in Rs and number of labor was presented in thousand numbers. One sample t-test and simple linear regression model were used to conclude the results.

The significance level of all parameters occurred at  $0.000 \pm 0.003$ , as well as t-test difference value of all variables came between  $t(09) = 2.79 \pm t(06) = 1.45$  against hypothesized value. At the end, sample size results were generalized with whole population and they were presented into percentages which are shown in Table 1, 2, 3 & 4. SPSS (16.0) computer software was used for this purpose.

### 5.1. Sample Size

The sample is based on 200 dairy farmers of district Hyderabad and 200 dairy farmers from district Sukkur .One area represent to Dairy Industrial Zone and other one area represent Non Dairy Industrial Zone.

### 5.2. Data Collection

Data has been collected through survey and questionnaire, from milk producers of Hyderabad and Sukkur region. Hyderabad region represent the population of dairy farmers who belong to non industrial area and Sukkur region represent the milk producers area which represent to dairy industrial area.

### 5.3. Statistical Techniques

Hypothesis testing was conducted by using one sample t-test and simple linear regression model. For each hypothesis one hypothesized value was chosen as a t-test value, for example, the wastage of milk in rural vicinity of Hyderabad is 70% percent. In this context, for each variable like *wastage of milk*, *employment generation and increase in milk production* hypothesized value were constructed and analyzed accordingly.

## 6. Review of Literature

M. Rashid (2004) conducted a thorough study on contemporary practices of dairy farming in Sindh. He found that 100% formers milked their cows manually, 87% use traditional equipment and only 12% farmers milked their cows hygienically, 93% farmers milking cattle twice in a day there as 7% thrice in a day. The major parameters were per day milk production, milking system, feed manual follow up, commonly used equipments on dairy farms, hygiene, and different marketing channels.

ZMA Hossain (2008) investigates the difference between commercial and traditional dairy farm management patterns, by conducting survey he revealed that those dairy farmers who run their farm as a full time job and sale milk in organized milk market their production level is high. He concludes that if proper cattle housing can be provided then the present conditions can be improved. He further explores that present management condition of private dairy farms in Bangladesh are unsatisfactory because 51% farmers cannot grow fodders due to the lack of land. The farmers in Bangladesh he and his other researcher fellow claims that they are lacking the required knowledge of management and awareness. The most important dairy farming sector of the country is suffering scarcity of feed and milk marketing facilities.

HM Spicer and L.A (1994) describe that poor management factor with reference to keeping record of the animal is an important aspect and can reduce or increase the profitability of a dairy farm. Furthermore, the quality of feed is very considerable among farms. It can create a positive difference if farmers develop an understanding about different managerial practices and techniques of the dairy enterprise. In the connection to his research it was indicated that the age of milking cattle is one of the most important factor in dairy business.

Babara Dart (2009) discusses the principle of Integrated Dairy Farm Management IDFM she constructed a model for a successful dairy farming and suggests developing a full plan for running a dairy business successfully. The researcher emphasizes that all farms should develop a plan because farm is a kind of firm or enterprise that involve all kind of business activities like, investment, risk, loss and profit. The further findings were submitted regarding a plan that it starts with mission statement or primary plan, business vision and mission, longs short term goals, transitional farm a tactical to a strategic mind set, she constructed

a model of action of plan containing distribution of dairy tasks namely responsible for accomplishment of the dairy role.

Babara Dart (2001) stresses the importance of planning and follows up of proper managerial practices at dairy farm, She relates the planning with economic benefits and further added that the systematic farming means doing a planning about all activities carries in normal routine on each dairy farm and suggest to establish Dairy Farming Management Committees (DFMC) to develop an organize milk market. She stresses upon the point that farm owner or manager is fully responsible for dairy farm planning.

Aun Wells Ron (2001) examine the basic characteristics of successful dairy farm management. He guides that successful farm can be managed, if farmers regularly care about certain pre determined standards such as secure inventory and farms recourse, keep farms planning, keep cattle record like cattle health, reproduction, nutrition and milk marketing. He further describes the requirements of proper dairy farm management and suggests some kind of inspection like assessment of water tank, risk measurement, calculation of monthly profit and loss and suggested resources.

Bernard L. Erven (2006) describes the role of dairy farm human recourse; he focuses Human resource model or paradigms. He added that people are precious asset of dairy business, trained and honest human resource is a sign of success and profit, but at same place dishonest and untrained human resource can damage the business and give huge economic loss. The nature of dairy business is complex, as a lot of activities are performed by dairy farmers in every day dairy farming life, and each activity involves a lot of amount or capital, so honest and trained human resource can save precious asset and capital. Bernard further surveyed that HRM of dairy farm management must require different trainings

relating to farm management and build a better environment on dairy farm.

Kathy Lee (2000) relates the relationship between milk marketing and human resource, during experiments the data has been gathered to determine relationship between farm success and human resource. The milk quality, milk marketing and finance for dairy business were main variables. Lee found out that best performance of HRM is directly related with farm profitability and milk production.

Waheed Burriro (2005) indicates the component of external environment of dairy farming like price adjustment of milk, availability of labor, competition in milk market. He found that external environment plays a vital role in farm management and is an essential ingredient in success of dairy enterprise, external environment of dairy farm deals with price adjustment, the pricing of milk is a complicated phenomenon in Sindh milk market as milk is sold into open milk market where prices are fluctuated and according to the quality and demand and supply level of milk prices are adjusted everyday. One liter of milk is sold in an open market from Rs.35 to Rs 55; the other milk market is whole sale market where middleman or wholesaler buys milk from dairy farmers. The open milk market is covered by small farmers whereas large and commercial dairy farmers sale their milk at wholesalers who buy milk on competitive rates from dairy farmers, the milk is bought on low rates and being sold to customers on high prices especially in city retail milk market the charges of milk are high. Buriro, suggests that which pricing system should have been controlled by government where farmers receive reasonable price of milk and customers buy milk on reasonable price in this regard he suggested that government may provide subsidy.

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## 7. Results and Discussion

In first instance milk production and cattle/buffalo population calculated, Table1 illustrates that currently in Hyderabad region per annum milk production is about 3.7 million/tons and the population of Cattle/Bufaloes is 1.4 million. By looking at poor milk production level in Hyderabad region, it is submitted that presently only 30% rural resources are in used, whereas 70% production factors are idle. Whereas in Sukkur region the farmers of same geographic size and resource produces three times more milk production (Ref: Table 03). Traditionally, 100% farmers of Hyderabad region sell milk in raw form and middleman buys that milk virtually on 32% low price (Ref: Table 02), so due to not getting right price, dairy farmers do not produce milk at high scale. About 85% dwellers in each UC listed in Table 02 produce their own milk, so this condition decrease demand of milk in respective areas, as a result, about 59% of milk is sold to middleman on low price.

Table 1  
An Analysis of Milk Production Factors in Non Dairy Industrial Areas (NDIA)

Table: 1-A						
	N	Mean	Std. Deviation	Std. Error Mean		
Milk Production	82	1.61	1.21846	0.13456		

Table: 1--B						
Test Value = 1.75						
	t	df	Sig (2-ailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Milk Production	-12.507	81	0	-1.68293	-1.9507	-1.4152

Source: Survey Data

Contingency Table#1 shows the conservative approach in form of total milk production in Hyderabad region. The hypothetical claim was made to find the significant level that what the total production of milk in Hyderabad region is. According to the claim the total milk production of Hyderabad region is 1.6 million tons per annum, one sample t-test was performed and the results prove the claim as, table-1 shows the mean level of total milk production which is 1.61 million tons per annum, whereas Table-2 illustrates the significant level, so in statistical term we may define that "The mean level of milk production is 1.61,  $SD = 0.1218$ ,  $N = 82$  was not significantly different from the hypothesized value of milk production 1.75 million tons of milk /pa at,  $t(81) = 0-12.50$ ,  $p = 0.000$ .

So it is proved that the total milk production of Hyderabad region is 1.75 million tons /pa. The hypothesis helps to adjust a fix milk production in million tons of Hyderabad regions. Also it supports to reach out the claim such as what is the wastage of milk, level of unemployment, low value of milk price and what would be the expected rise in milk production if the dairy industry is established in Hyderabad region or its suburb.

Table 2  
An Analysis of Milk Market Value in Non Dairy Industrial Areas

Table# 02-A						
	N	Mean	Std. Deviation	Std. Error Mean		
Suitable Price	91	31.64	1.343	0.042		
Table-02-B						
	Test Value = 32					95% Confidence Interval of the Difference
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Suitable Price	-1.3	90	0	-42.363	-42.44	-42.28

Source: Survey Data

Table#2 illustrating the results of current wholesale price of milk in rural vicinities, receives local dairy farmers; "The hypothesis is that averagely rural dairy farmers receive 32% low price of milk than standard milk market. Here are the statistical presentations of results; the mean level of result is 31.64,  $SD = 1.34$ ,  $N = 91$  which is not significantly different from the hypothesized value of 32% less milk price at,  $t(91) = -1.3$ ,  $p = 0.000$ ." So it is proved that dairy farmers of Hyderabad region 32% low milk price than standard milk market of Hyderabad city.

Table 03  
Percentage of Low Milk Price in Non Dairy Industrial Areas

Districts/UC	*(-I%)
Hyderabad	21
Tando Jam	22
Hatri	25
T.G Hyder	36
Tando Allahyar	33.4
Chamber-1	39.1
Sanjar Chang	34.74
Bagan Jarwar	36.1
Tando M. Khan	37.3
Tando M. Khan-01	33.4
Tando M. Khan-02	39.1
Tando M. Khan-03	37.3
Matiari-1	36.5
Sekhat	17.4
Allah Dino Sand	19.8
T 04/11	-32%
*STD =Standard whole sale price /Standard price of 40 liters of milk is Rs 2435 in Sukkur region DIA	

Source: Survey Data

Table#3 exemplifies negative trend of low value of milk against standardized price Rs2435 in total 11 milk producing areas of Hyderabad. This situation damages whole dairy farming institutions and generates low production and unemployment in

region. As dairy farmer holds a position of traditional entrepreneur in area who invest in dairy animals, take risk, do hard work and carry continuous struggle. Therefore, they anticipate that these efforts will bring prosperity for them but low profit creates difficulty even in managing every day expenses like animal nutrition, health and salaries for labor.

Table 04  
An Analysis of Losses in Non Dairy Industrial Area

<b>Table-04-A</b>				
	N	Mean	Std. Deviation	Std. Error Mean
Wastage of Milk	97	178.64	1.343	0.042
Unemployed Labor	87	77.49	1.145	0.036
Economic Loss	86	99.66	1.158	0.036

Source: Survey Data

<b>Table-04-B</b>						
Test Value = 0						
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Wastage of Milk	6.511	95	0	2.637	2.56	2.72
Unemployed Labor	6.732	83	0	2.494	2.42	2.57
Economic Loss	4.224	85	0	2.658	2.59	2.73

Table # 04 proves the claim that low market value of milk produce 77.7 unemployment, 179.6 million tons wastage of milk and economic loss of Rs9909 million at Hyderabad region. The statistical results illustrates that the  $M=178.64, 77.49, 99.6$   $SD=1.3, 1.1, 1.15, N=97, 87, 86$  at  $t=(95, 83, 85)=6.6, 6.7, 4.2, P=000$ . The statistical results shows that there is no significant difference in hypothesized value and t test results; so it is proves that the unemployment level, wastage of milk and value shown in descriptive table #09 is significant.

Table 05  
Descriptive Data of Unemployed Labor, Wastage of Milk and  
Economic Loss of (NDIA)

Districts/UC	*UEL	*WM	*Rs
Hyderabad	31.00	30.5	1672
Tando Jam	55.00		
Hatri	79.00		
T.G Hyder	61.00		
Tando Allahyar	68.00	23	2244
Chamber-1	40.80		
Sanjar Chang	22.44		
Bagan Jarwar	40.00		
Tando M. Khan	70.00	89.2	4930
Tando M. Khan-01	44.00		
Tando M. Khan-02	70.00		
Tando M. Khan-03	53.00		
Matiari-1	54.00	19.2	1058
Sekhat	31.00		
Allah Dino Sand	26.00		
<b>Total</b>	<b>745.2</b>	<b>162</b>	<b>9904</b>
UEL= Unemployed labor (000), Rs in million=Value of wastage of milk			
WM =Wastage of milk/(000/Tones)			
PA=Per annum			
NDIA=Non dairy Industrial Area			
*Wastage re presents depletion of milk in all conditions like during transport, open milk market, and surplus milk			
due to parturition et cetera.			

Source: Survey Data

Table-05 highlights that about 7.9 million labors are unemployed, the wastage of milk is 179.6 million tons/per annum and economic loss occurs about Rs9.94 billion. Virtually, dwellers of Hyderabad region are only trained in dairy farming sector so apart from agriculture there is no alternative job available for them. Mostly wastage of milk arises when middleman does not buy milk from farmer and they decide to sale it in city market directly. Weaker dairy conditions and low market value of milk creates more stress in farmer's life. These are the facts which dragged to change selling patterns of milk like converting

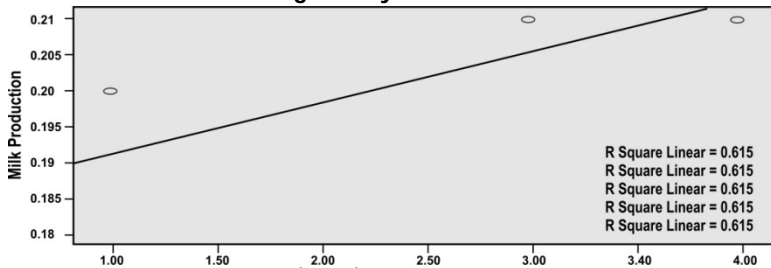
raw milk into finished milk products like skim/semi skim and pasteurized milk. Farmers who supply milk to dairy industry in Sukkur region are more comfortable and generate more milk and revenue comparatively to Hyderabad region shown in Table 4 and figure 1.

Table 06  
Surplus Milk Production and Earning in Dairy Industrial Area (DIA)

Districts/UC (Sukkur Region--DIA)		
Districts/UC	Surplus Milk Production (ml)	Rs (m)
Sukkur	0.2	11
Pano Akil	0.18	9
Rani Pur	0.19	8
Shikarpur	0.21	12
Lakhi	0.18	8
Chak	0.21	12
Khanpur	0.21	13
Rustam	0.2	11
<b>04/04</b>	<b>1.58</b>	<b>84</b>
*Surplus Milk Production=Tons/per annum, Rs = Value of milk production /per annum		
DIA=Dairy Industrial Area		

Source: Survey Data

Figure 1  
Relationship of Dairy Industry with Milk Production in Dairy Industry  
Cases weighted by Milk Production



\*Figure # 1 independent variable (Y-axis) shows milk production in million tons, whereas the dependent variable (X-axis) shows districts of Sukkur region 1=Shikupura, 3=Khairpur and 4=Rani Pur.

Source: Survey Data

Figure#1 illustrates that if the farmers receive right price of milk then they can produce extra milk production which can go up to 21±018 million tons per annum which can generate extra revenue Rs45.3 billions/per annum. In this contest, in Hyderabad region the market value of milk and milk production is low comparatively to Sukkur region. As a result, it is proved that there is significant positive impact of dairy industry on milk production, employment and milking animal population. If dairy industry is established at Hyderabad region then this will boost up the milk wholesale price, reduce monopoly of middle man and support to allied dairy institutions like feed supplier, medical staff, and consumer health and so on. According to economic point of view it is an ideal opportunity for investment for local and international investors. Especially those countries which are advance in dairy sector like Australia, New Zealand, Netherlands and United States to invest in dairy sector in Hyderabad region of Pakistan.

## 11. Conclusion

It is concluded that, about 85% households in rural vicinity are engaged in milk production, 100% milk is sold in raw form while 59% farmers sell milk to middleman at 32% lower price as compared to standard market price of the region. The wastage of milk is about 0.17 million tons per annum that can be considered a huge amount which the national economy suffers in the form of loss. In contrast, those farmers who belong to dairy industrial area sell milk to industry in Sukkur region are receiving better price as compared to other region as the results of the study showed. The further findings also stimulate that there should be an organized dairy industry in Hyderabad region which will certainly play a pivotal role for upliftment of dairy industry in the region. As about 0.82 million tons/per annum surplus milk production will increase and 0.79 million as well as additional rural employment will also be generated. In short, dairy industry can endow with about Rs45.3 billion profit/per annum. Thus, local and foreign

investor can earn substantial profit if they invest in dairy industry of the region.

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