

Supply chain of fresh milk from producer to consumer: a case study of Allahabad India

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Abstract

This study was carried in November 2015 to march 2016 in Allahabad provinces, Uttar Pradesh, India to analyze current supply chain of fresh milk. Allahabad province is located at 25.450North, 81.840East and located 3858.3 inch above sea level. The aim of this study is to analyzed the existing supply chain of the fresh milk, determine the problems face by milkman during the supply of fresh milk from producer to consumer, study the consumer preference of traditional and modern supply chain of fresh milk. Sixty-eight producers, forty retailers, twenty commission agents, eight diary plants and sixty eight consumers were interviewed.

The fresh milk supply chain was supply chain 1 (from producer to consumer); supply chain 2 (from producer to retailer to consumer); supply chain 3 (from producer to commission agent to wholesaler to consumer); supply chain 4 (from producer to diary plant to retailer to consumer. These supply chain help to transfer fresh milk from rural area to urban area. The problems face by the milkman during supply chain of fresh milk such as transportation, animal and high price of feed and fodder. On analysis of consumer preference of traditional and modern method based on freshness, low price and good quality emerged the most important factors to prefer traditional method. The demand of traditional method in the study area is high as compare to modern method.

Through this study analysis shows that price for net marketing and gross marketing and producer's net profit were significantly higher than supply chains. In supply chain 1 of marketing, the price of fresh milk for consumer was significantly lower than other supply chains. For supply chain 4 has total marketing cost, its loss, and margin of marketing were significantly higher in the comparison of supply chain 1, 2 and 3. Transportation of product, used electricity and feed and fodder are important element which influences the cost of milk in different supply chain. There were large decline in market efficiency and producers shear in consumer price as the intermediate rises in different supply chain. The problem faces during fresh milk supply chain were solving by improving the storage and transport facilities, correct information and knowledge about the product for production and marketing. This technical information was give financial help in milk or business. The polices and regulation should implement to preserve the quality and hygiene of fresh milk during production and distribution.

Keywords: Supply chain, Traditional and Modern method, Marketing efficiency, Dairy plant,

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I. Introduction

Supply chain management (SCM) is the major area of interest to both academic and business management practitioners. The supply chain management came into existence in early in 1990. The integration of sellers, retailer, warehouses and manufacturers are the main focused area for the supply chain management, with the objective to satisfy customer demand by producing and delivering the product on time and in the right quantities in low cost.

According to Thorpe et al., (2000)[1] supply chains have a treaty with a different type of organization, for example raw milk is supply from dairy farmers to consumers directly. The whole supply chain management process is about managing the entire process in a unified and collective way. A supply chain consists of stages which the aim to fulfill customer demand directly or indirectly. Supply chains are becoming highly integrated and novel in production of the product and supply chains are also revolutionizing the way in which products are being produced, distributed and marketed.

According to Dunne (2007) [2] there is a conflicting relationship among suppliers and clients of the product in the supply chains due to interdependency stakeholders' and their different needs and interests. The good understanding among members of chain supply affect overall supply chain profit which was effectively increase by the members in supply and demand of the product in market (Simatupang and Sridharan, 2002) [3]. According to Page and Slater (2003) [4], in developing countries agro-food supply chains faces many problems that are inspire by their particular structures such as division of raw material according to their use and

inadequate aptitude of farmers to get the production magnitudes, batches variability in matter of quality for the raw material in dairy zones (Ruben et al., 2007 and Amorim et al., 2013) [5,6].

According to dairy industry analysis in India, the world's biggest milk producer is India which is estimated around 17% of the world milk production. India is the biggest milk producers and consumer of milk products, therefore the production of milk especially in India is analyzed to be increase at a CAGR almost 4% from the year of 2011 to the year of 2015. India is known to be the leading country in milk production in the world wide which gives the description of 121.8 million of tones in total amount. Currently with the annual growth rate of 7%, dairy market is growing in positions of capacity. The Indian dairy industries have the approximately US\$ 45 billion turnover per year. The major reason for the high demand of milk and milk products in India is that the more than 50% part of India, people are vegetarian, thus milk is an important part of the daily diet and popular beverage and also its have high nutritional value in many households. According to Davies et al., (1986) [7] milk is the main component of the daily diet of human being, during different age groups such as infants, children, and elders and especially in old age.

According to Kumar and Staal, (2010) [8] in India 80 percent of marketed milk, handling of raw milk and traditional milk product were pass by the help of the traditional method of milk supply. The traditional and informal milk supply chains were the main channel for smallholder dairy producers and main resource for supply of fresh milk to consumers. Lacking nutrient in the feed of cattle with expanding population human is also a problem face by small holders, land resource are used by the farmers for the cultivation of food crop and not preferred to fodder crop.

The main emphases of this study were to critically analyze the traditional and modern supply chains of Allahabad district in India. This study focus on especially the fresh milk chain of supply and logistic in Allahabad district, India which will be study options of traditional and modern supply chain of each characteristic. The study identifies the problem face by milk producers at different stages of fresh milk supply chain. Study the consumer preference on traditional and modern supply chain and why.

II. Materials And Method

The Allahabad district, located in east part of Uttar Pradesh, India. A district with area 5482.10 sq. km and surrounded by Pratapgarh and Jaunpur in north, Varanasi in east and Mirajapur is on the south. The population of the district is 49.36 Million with people density 911 peoples per sq. km. It has 20 blocks.

Allahabad district is rich in animal resources particularly dairying. The total number of breed able mulch animals in different categories include cross bred cows (79599), local Varsity cows (599123), buffaloes (472671). The average yield of milk is 2413 Million liters/annum. The total number of milk societies is 557, supported by 153 veterinary hospitals and 98 animal husbandries. The poultry birds are estimated to be 300437 in the district, which is another important subsidiary occupation.

2.1 Data Collection

The method of obtaining required data is carried out by the following ways

2.1.1 Primary data collection

The evaluation of supply chain of primary data for fresh milk in the relation between transportation, marketing costs, wastage cost during marketing, loading, sale price, wholesalers and retailers were collected through voice of customers. In the process of assessment the collected data from milk producer, commission agents along with wholesalers, retailers and milk processing plant consumers for each & every supply chain formats. 68 Milk producers, 20 wholesalers, 40 retailers, 8 milk processing plant and 68 consumers will be interview.

The audit was also conducted to know customer choices of traditional or modern supply chain of fresh milk. The all-around organized and pre-tried surveys was utilized to comprehend shopper purchasing conduct as for value, freshness, quality, accommodation, accessibility of new drain, administration rendered, cleanliness conditions and show and so forth.

2.1.2 Secondary Data Collection

Milk production and its consumption comes under the secondary data collection, marketing pattern in some district population was found to be from various sources such as National and international journals, articles, thesis, research, Economics, Finance Ministry, Government of India; Basic Animal Husbandry Statistics, National Dairy Development Board, Agriculture Ministry and different reports from Reserve Bank of India. For The simple analysis of economic such as percentage of consumption, growing rate per year and variation are used to complete the collection.

2.2 Data analysis

Collected data from both methods quantitative and qualitative collected from primary and secondary analysis, and the whole data was analyzed by using statistical tool and excel to calculate the benefits of production and consumption and its cost ratio from manufacturing to benefits.

2.2.1 Descriptive analysis

Descriptive analysis is the statistical analysis which was performed in SPSS and Excel. This was collection of data on quality basis of all farms in order to determine the reliability of raw material and product among the farmer's objectives, strategies and performances.

2.2.2 Quantitative analysis

Financial analysis of fresh milk is done quantitatively to estimate the cost and profit obtained from several supply chain. This analysis consists of logistic cost and cost and return.

2.2.3 Marketing Supply Chain Analysis

Marketing supply chain includes whole chain from producer to consumer. The inventory network comprise different intermediates, for example, commission operator, wholesalers of item and retailers who take crisp items from agriculturist to maker and after that maker to buyer. The subsequent promoting supply will be dissected in the present study in light of the fact that these are the normally utilized inventory network as a part of Allahabad locale, India.

- Producer to Consumer
- Producer to Retailer then Consumer
- Producer to Commission Agent and Wholesaler then Consumer
- Producer to Dairy plant and retailer then Consumer

- The producer / farmer net market price were calculated by the following method

$$NMP_p = GMP_p - [MC_p + PL_p \times GMP_p]$$

- The net profit of producer were calculated by the following method:

$$NP_p = GMP_p - (CP + MC_p + PL_p \times GMP_p)$$

- The net marketing margin for wholesaler will be calculated by the following method

$$NMM_w = SP_w - PP_w - (MC_w + PL_w \times PP_w)$$

- The net marketing margin for retailer were calculated by the following method:

$$NMM_r = SP_r - PP_r - (MC_r + PL_r \times PP_r)$$

- The total marketing cost were calculated by the following method

$$TMC = MC_p + MC_w + MC_r$$

- The total net marketing margin of wholesaler and retailer were calculated by the following method

$$TNMM = NMM_w + NMM_r$$

- Total marketing loss were calculated by the following method

$$TML = (PL_p \times GMP_p) + (PL_w \times PP_w) + (PL_r \times PP_r)$$

- Total gross marketing margin were calculated by the following formula

$$TGMM = GMP_p - PP_c$$

- The marketing efficiency for different market supply chain of milk was calculated by the following formula (Acharya and Agarwal, 2011).

$$ME = NMP_p / TNMM + TMC$$

- The producer share in consumer price were calculated by the following formula

$$PSC = NMP_p / PP_c \times 100$$

Where,

NMP_p = Net market price received by the producer (Rs/Kg)

GMP_p= Gross market price received by the producer (Rs/Kg)
MC_p= Marketing cost of producer for transportation, packaging, loading, unloading and commission (Rs/Kg)
PL_p= Physical loss of fresh produce by producer during transportation and marketing (Rs/kg)
NP_p= Net profit of producer/farmer (Rs/Kg)
CP= Cost of production (RS/Kg)
NMM_w=Net marketing margin of wholesaler (Rs/Kg)
SW_p=Wholesaler sale price (Rs/Kg)
PP_w= Purchase price of wholesaler (Rs/Kg)
MC_w= Marketing cost of wholesaler for transportation, packaging, loading, unloading, commission, rent, electricity and labour etc (Rs/Kg)
PL_w= Physical loss of fresh product by wholesaler during the transportation and marketing (Rs/Kg)
NMM_r= Net marketing margin of retailer (Rs/Kg)
SP_r= Retailer sale price (Rs/Kg)
PP_r= Purchase price of retailer (Rs/Kg)
MC_r= Marketing cost of retailer for transportation, packaging, loading, unloading, commission, rent, electricity and labour etc (Rs/Kg)
PL_r= Physical loss of fresh product by retailer during transportation and marketing (Rs/Kg)
TMC= Total marketing cost (Rs/Kg)
TNMM=Total net marketing margin (Rs/Kg)
TML= Total marketing loss of produce (Rs/Kg)
TGMM= Total gross marketing margin (Rs/Kg)
PP_c=Price paid by consumer (Rs/Kg)
ME= Marketing efficiency
PSCP=Producer share in consumer price(%)

III. Results And Discussion

Present study is about the consumer and consumption of milk is based on the collected data from the Allahabad district and other details about the study area. This study also demonstrate about the basics of its characteristics of socio economics; such as milkman, wholesaler, retailer, commission agent such as gender, education level, number of animal and experience at different situation of the business and source of loan for livestock and consumer preference of traditional and modern method. The problems face by the milkman during the supply chain of fresh milk.

3.1 Profile of study area and farmer socio-economic characteristics

3.1.1 Background of Allahabad district India

Allahabad district is located at 25.45°N 81.84°E in southern portion of the Uttar Pradesh at 98 meters of height that is 322 ft. and positioned at the junction of two great rivers, the Yamuna and Ganga. Allahabad has total area of 5482 sq km. Allahabad district is surrounded by the district of Pratapgarh from the north, south direction is covered by the Rewa (M.P.), from the east Sant Ravi Das Nagar and west is covered by kaushambhi districts.

3.1.2 Economic activity

3.1.2.1 Agriculture

Agriculture crops is the wide field to cover which also includes paddy which has largest share such as Arhar, Moong, Bajra and Urd, their growth and production depends on the season. Wheat is also one of the dominant crops of agriculture, especially in Rabi wheat is a dominant crop which is trailed by the different pulses and oilseeds. Mustard is very useful and is also mostly used cooking oil but its pure farming rate is very less but it is farm in form of mixed crop. In this district Linseed oilseed is the dominant one and mostly farmed in the area of Jamunapar area. Like this some other pulses like, Gram, Lentil (masoor), Pea and Barely has equally good domain.

3.1.2.2 Livestock

The cattle are in Allahabad is being utilized for two purposes either in household work or for the business purpose. Cow, Buffalos, Goat, Pigs, and Dog is very common in Allahabad can easily found there.

3.1.2.3 Forest

Allahabad has total forests covered an area of 21455 hectares in 2010-11 extending over 3 percent of the total environmental area of the district. Nearly portion of the Vindhya Hills is having a rich forest belt. In the district the kinds of forest produce available are Timber, DhakvandTendu Leaves, Moonj, Bamboo and Cane.

3.2 Milkman socio economic characteristics

3.2.1 Gender, age, education and milk supply chain experience of respondents

The total sample size of this study was 212 where 68 milkmen, 28 retailers, 20 wholesaler, 20 commission agents, 68 consumers and 8 dairy plants are interview(**Table 1**). Milk supply chain normally dominated by male and there is very less involvement of female. Most people in this study area were working age, between 25 to 60 year old. Most of them are 35 to 55 year old.

Table 1 Gender and age of milkman in the study area

Frequency	Percent	
Total sample	68	100
Gender		
Male	68	100
Female	0	0
Average age of sample		
25-34	13	19.11
35-44	20	29.4
45-54	28	32.3
55-60	7	10.2

3.2.2 Socio economic characteristics of retailer gender, establishment of shop, status of ownership of the business

From the field survey, total 28 retailers are interview among which 100% were male. Furthermore 64% of them are very less experienced, 10.71% has no experienced. 100% of them have their own of the business and they did not do the business in partnership (**Table 2**).

Table 2 Gender, establishment of shop, status of ownership of the business

	Frequency	Percent
Total sample	28	100
Experience of business		
0-4	3	10.71
5-9	7	25
>10	18	64.28
Ownership of business		
Owned	28	100
Partnership	0	0

3.2.3 Socio economic characteristics of wholesaler gender,age, and qualification of the wholesaler

According to the field survey, 20 wholesalers are interview in which all are male and no female were found (**Table 3**). 70% of them are graduated and others 10 % have done only high school and 20% are intermediate. 70 % of wholesaler are between the age group of 30 to 45 and 30% are between 25 and 29 which shows most of them are senior.

Table 3 Gender,age, and qualification of the wholesaler

	Frequency	Percent
Total sample	68	100
Gender		
Male	68	100
Female	0	0
Average age of sample		
25-34	13	19.11
35-44	20	29.4
45-54	28	32.3
55-60	7	10.2

3.3 Milk production and supply chain of fresh milk in study area

3.3.1 Herd size of the respondents

In the study area there are two types of herd size of livestock some are small herd size, 80.88% (< 10 livestock), and 19.11% has large herd size of livestock (> 10 livestock's). From the survey, small herd size of livestock was found high(**Figure 1**). Everyone has their own business small size livestock are easily manageable, so smallholders normally prefer small herd size of livestock.

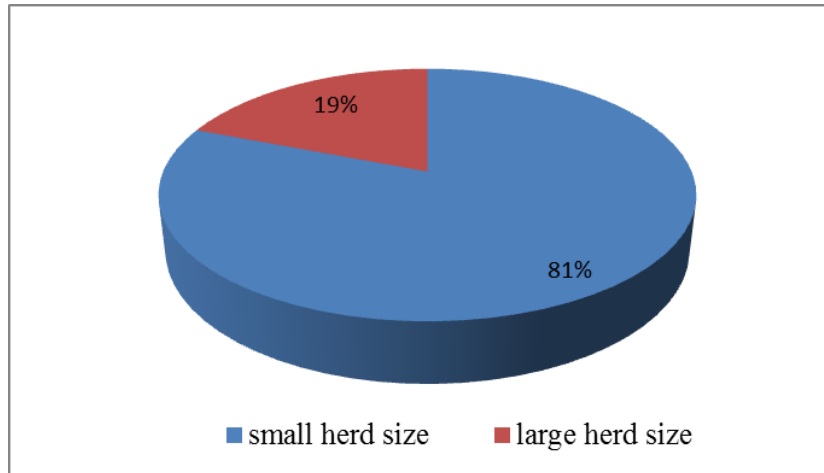


Figure 1 the percentage distribution of form sizesSource: Field survey

3.3.2 Feed and fodder

From the survey, farmers provide healthy feed to animal for high production of milk. Farmer has different way of providing the feed such as some farmer provides the feed three times but some are providing four times. Those farmers provide feed three times they leave the animal for grazing. According to survey farmer are use different types of feed and fodder such as straw, west of mustard, chuni, wheat husk, green fodder, calcium, are the common feeds. From the survey, 90 % of the farmer provide dry fodder only 10 % are provide green fodder are leave the animals for grazing . Those farmer not provide green fodder they use calcium and west of mustard for high production of milk. In the **figure 2**(a) is the green fodder,(b) is the wheat husk,(c) is the west of mustard and (d) is the calcium are fees and fodder provide to animal for high production of milk.



Figure 2 Types of feed and fodderSource: from field survey

3.3.3 Milking

From the survey, milking of animal is done by two ways. 95.59% farmers are done the milking manually and 4.41 % are use milking machine (**Figure 3**). According to survey farmer are avid to milking by machine because machine cause udder cancer and machine shuck blood in milk. Machine is normally use by those who has large form of livestock otherwise manually milking is done. In the figure (a), (d) milkman milking manually, (b) is the milking machine and in figure (c) shows how to use the milking machine.



Figure 3 Types of milkingSource: field survey

3.3.4 Loading and transportation

After milking, loading and transportation is occurs. From the survey, farmer has milking milk in the bucket and then it transfers in the metal can. Farmer put cans on vehicles and supply in the market. Most of the farmer use motorbike for the fresh milk supply chain and some farmers are use bus, train and other transportation system. In the study most of the farmer use bus or won vehicles few of them use train.

3.4 The current statuses of milk supply chain in study area

In the study area four type of supply chain are present with the help of these fresh milk supply chain milk transfer from producer to consumer. In this supply chain five member are involved such as producer, retailer, commission agent, wholesaler, dairy plant and consumer. We discuss every supply chain one by one.

Supply Chain 1- Producer to Consumer

Supply Chain 2- Producer to Retailer then Consumer

Supply Chain 3- Producer to Commission agent and Wholesaler then Consumer

Supply Chain 4- Producer to Dairy plant and to Retailer then Consumer

Current status of milk supply chain. Source: Field survey

3.4.1 Supply chain first (SC1)

In first supply chain milk was directly transfer from producer to consumer. It is very short method of supply chain, in this supply chain only two members are involve. In this supply chain producer sell milk directly

to consumer no intermediates were involve in this method. First supply chain is very old method of milk supply. It is also called traditional method of milk supply. According to field survey the demand of first supply chain is high because there were no intermediates present and milk is fresh in consumer perceptive. The similar result were reported by (Kumar, 2008) [9]

3.4.2 Supply chain second (SC2)

In second supply chain three members are involve those are producer, retailer and consumer. Retailer plays an important role to transfer the milk from producer to consumer. Retailer collects the milk from producer (milkmen) and sells the milk to consumer. Some milkman has no time or has some problem to sell the milk directly to consumer; therefore farmers sell the milk to retailer. In second supply chain the most important factor is that farmer did not need to pay transportation cost because retailer collects the milk directly from milkman home. As a result producer got benefited.

3.4.3 Supply chain third (SC3)

In third supply chain four members are involve those are producer, commission agent, wholesaler and consumer. Producer and commission agent are intermediates they help in supply chain of fresh milk from producer to consumer. Commission agents collect the milk from producer (milkmen) and sell to wholesaler. From the field survey commission agent has very less profit in this supply chain.

3.4.4 Supply chain fourth (SC4)

In fourth supply chain it has also four member's producer, dairy plant, retailer and consumer. Fourth milk supply chain is different from other three, in this supply chain dairy plant is present where processing and packaging is occurs. Nowadays this supply chain called as modern supply chain. In this supply chain producers sell the milk to dairy plant where processing and packaging occurs after this retailer collect the milk from dairy plant and sell to consumer.

3.5 Problem face by milk producer (milkman) at different stage of fresh milk supply chain in study area

In these studies area there was very high risk which causes problem in fresh milk supply chain. From the survey, 68 milkmen are interview among which 61 milkmen (89.70%) face different risks during milk supply but rest 7 milkmen (10.29%) does not faced any problem during milk supply(**Figure 4**). There are 4 major risks are found during the survey such as risks related to animal, transportation, feed and fodder and less place for sell the milk. According to the survey 29.41 % are facing problem related to animal 14.70 % are facing the problem related to transportation, 23.51% were facing the problem related to feed and fodder 14.70% were facing the problem related to less place to sell the fresh milk in area and 8.82 % are facing the problem related to medicinal costs(**Figure 5**). In the study area most of the main problems faced by the milkman related to animal and feed and fodder. We are discussing in these problems one by one.

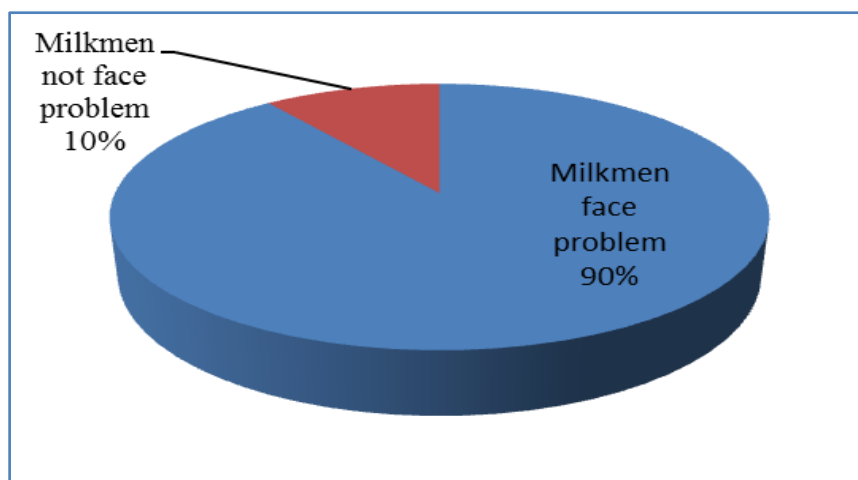


Figure4 Milkmen problem analysis Source: Field study

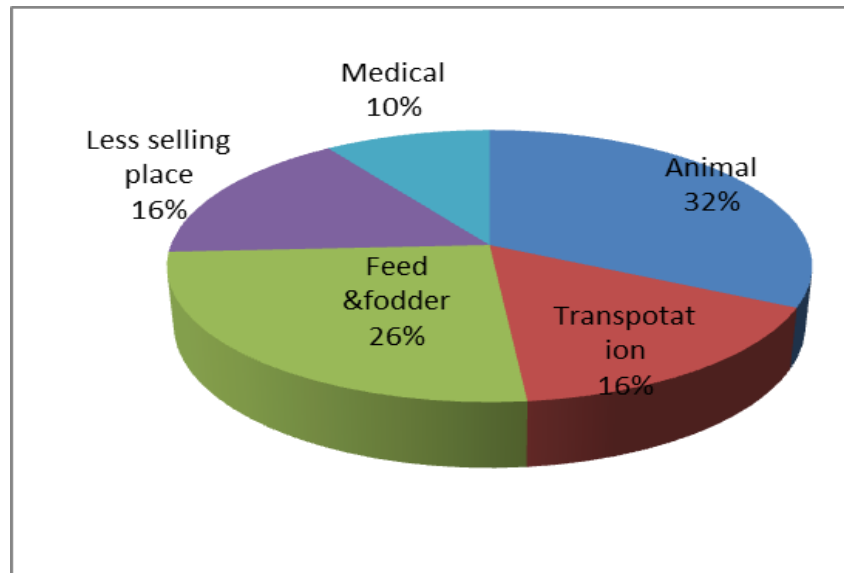


Figure 5 Major problems Source: Field survey

3.5.1 Animal problem

Animal related problem is the biggest problem faced by milkman in the fresh milk supply chain. From the survey, there are many types of animal problem like fever, animal death, different type of diseases and low milching animal. When the animal was suffering for fever milk production decreases and milkman did not get any profits. According to the survey, sometime animal has much health's problem due to which animal suddenly die due to lack of proper nutrient and facilities. Another problem related to animal is different type of diseases like khurpka, mouth diseases and many others.

3.5.2 Transportation

Transportation is the big problem faced by milkman in the fresh milk supply chain. According to the survey milkman faced many problems like high transportation cost, less transportation system, high fuel cost and bad road condition. Due to the high transportation cost milkman got less profit due to which milkman suffers. Some area has very less transportation system so it takes time to supply the milk due to which sometimes milk destroyed. The cost of fuel is high so transportation cost is also high so milkman gets less profit.

3.5.3 Feed and fodder

Feed and fodder has second big problem for the fresh milk supply chain. According to the survey, less availability of feed and fodder, high cost of fodder and lower quality of fodder causes problem in milk supply chain. According to survey 95% farmer are use dry fodder for the animal feed and very less farmer are using green fodder because of increase of population day by day. Demand of grain and vegetable are high which force the farmers to grow more grains and vegetable. As a result farmers are providing dry fodder to animal due to which milk production decreases. Therefore farmers do not have profit. Sometime feed and fodder are not of good quality because shopkeepers are mix some contaminant in feed due to which animal getting sick frequently and milkman face problem.

3.5.4 Less selling place

Due to less selling place milkman faces problem in supply of the fresh milk from village to city. Due to which milkman face problem during the time of transportation, due to high transportation cost and loading and unloading charges. According to the survey, some farmer load fresh milk on bicycle and go to market then take bus to reach city. Sometime milk was destroying due to long time take during transportation and farmers face problem and get less benefit.

3.5.5 Medical

Due to less and poor medical facility farmers face different problems such as animal death, not proper checkup and less animal husbandry. According to the survey, doctor available in survey area not able to identify the diseases and animal die therefore farmer suffer from huge loss. According to survey some area has no doctor due to which farmer not able to do the proper checkup of animal and slowly - slowly animal milk production decreases and of poor quality. Therefore farmer suffer from huge loss in all condition.

3.6 Consumers' preference on traditional and modern supply chains of fresh milk in study area

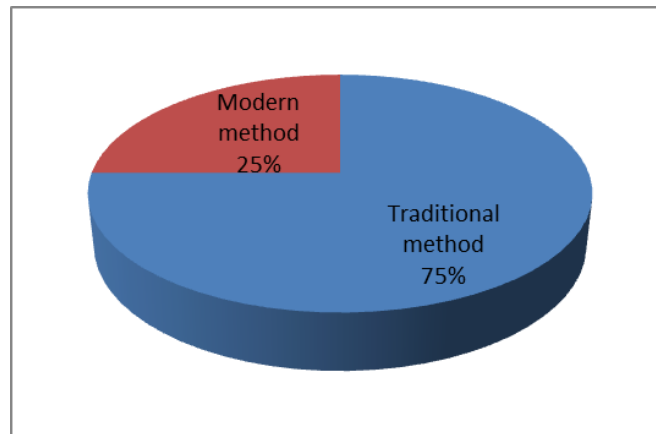


Figure 6 Preference of traditional and modern method Source: field survey

According to the survey milk supply chain were done by two method first, traditional methods and second modern method (Figure 6). In Allahabad, milk productions were dominated by smallholder producer having few buffaloes or cattle and used crop deposits, for example, rice and wheat straw as encourages. According to Birthal and Pratap[10] the farmer were responsible for 69 percent of net milk production in India in 2008. In a study area 75% of consumers prefer the traditional method and 25% prefer modern method. According to the survey the demand of the traditional milk supply chain in study area is high as compare to modern milk supply chain. From the survey most of them prefer traditional method because of good service, freshness, low price and good quality. In traditional method milkman sold the milk to consumer directly or with the help of retailer or wholesaler. Some of them who prefer to modern milk supply chain because of shop are nearby home and they use less amount of milk. Conventional milk value network additionally assume a vital part in modern milk production network on the grounds that most of the milk were provided by milkman at collection center of modern milk supply chain, which were then process and supply in market . The similar to result were reported by Staal et al., (2006) [11]; Kumar and stall, (2010)[8]. As per them almost 80 percent milk still go through the traditional method and different strategies are applied in taking care of crude milk and routine handled items.

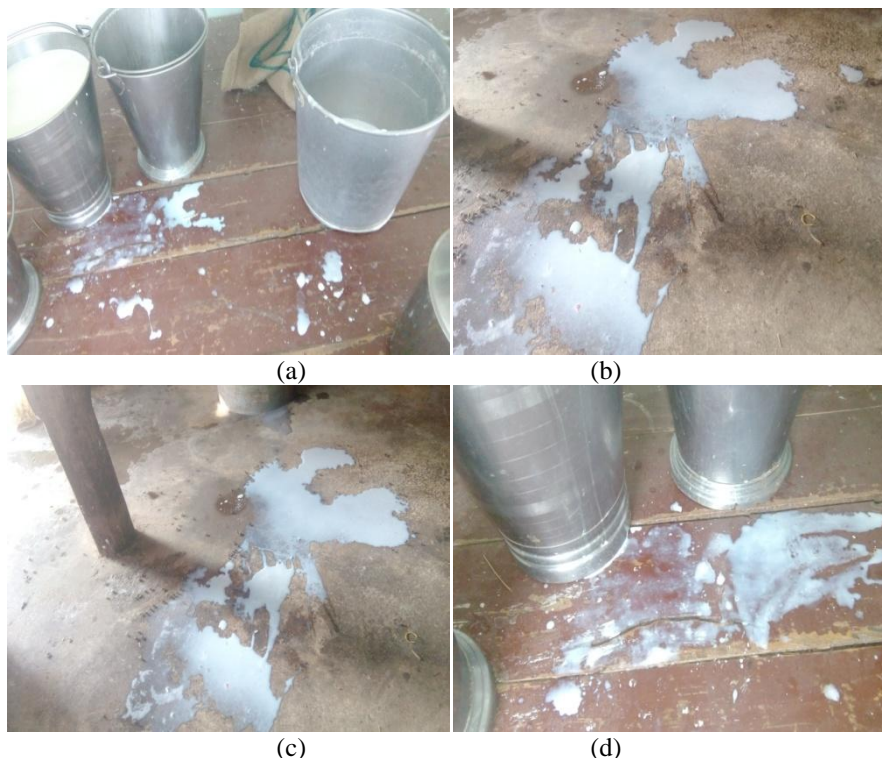


Figure 7Waste of milkSource: Field survey

3.7 Gross marketing price, net marketing price, and net profit of producer and consumer price

Through the ANOVA examination of the gross promoting value, net market cost, and net benefit of maker and buyer cost of milk in various milk value networks is classified. From result the gross marketing price, net marketing price, and net profit of the maker and purchaser cost of milk among the different milk value network SC1, SC2, SC3, and SC4 are profoundly noteworthy. The gross marketing cost of the maker for the milk value network SC1 (maker - buyer) was essentially higher (Rs 40.30/kg) trailed by SC2 (maker- retailer - purchaser), SC3 (maker commission operator - wholesaler – shopper) and SC4 (maker - journal plant - retailer – customer). Net marketing cost and net benefit of maker was likewise essentially higher in milk market network SC1 took after by SC2, SC3 and SC4. However the buyer cost was essentially lower (Rs 40.30/kg) in promoting store network SC1 yet there were no centrality contrast in shopper cost for advertising inventory network SC2, SC3 and SC4 (Rs 44.55 to 48/kg)(Figure 8). The general consequence of the gross promoting cost, net market cost and net benefit of maker declines altogether on the grounds that the quantities of middle people increment in advertising production network. In this way the buyer cost increments fundamentally as the expansion middle people in promoting store network. The gross market value, net market cost and benefit of maker and buyer cost of milk are distinctive in various promoting inventory network.

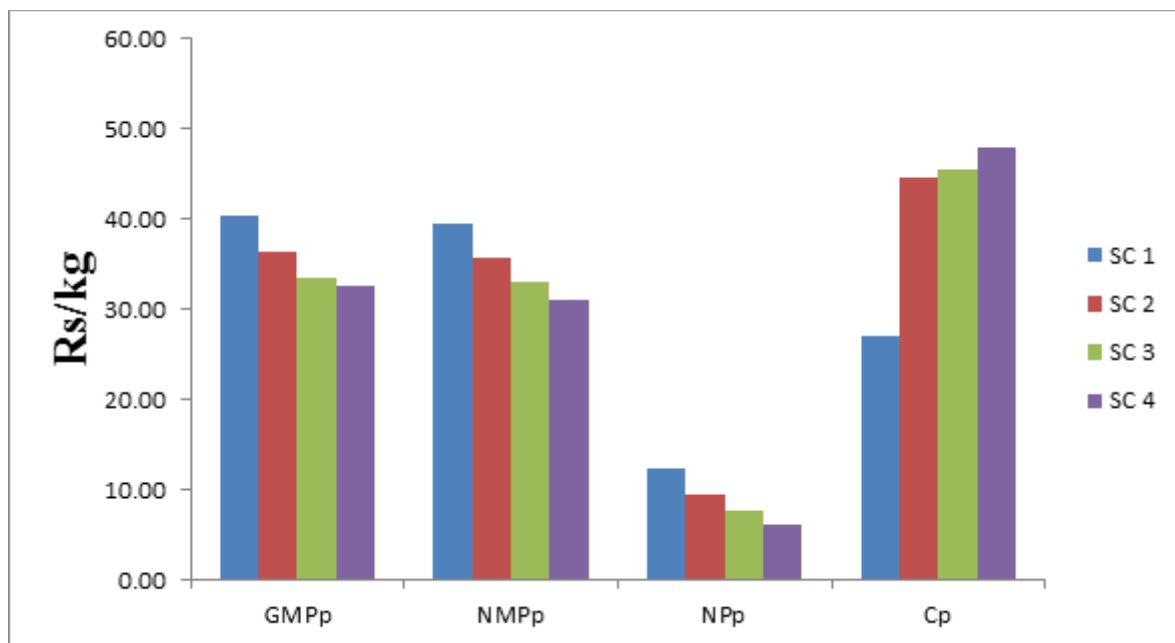


Figure 8 Gross marketing price of producer (GMPp), net marketing margin of producer (NMPp), net profit of producer (NPp) and buyer price for fresh milk in various milk value chains

3.8 Marketing cost, marketing loss, and total net marketing margin

Through ANOVA analysis for total milk marketing cost, its loss and total margin of marketing of crisp milk in various milk value network are analyzed. The milk total marketing cost, total marketing loss and total marketing margin among milk value network SC1 (maker - purchaser) SC2 (maker – retailer – buyer), SC3 (maker – commission specialist – wholesaler – customer) and SC4 (maker journal plant – retailer – consumer) were highly significance. In milk marketing network SC1 the total marketing cost was significantly minimum as compare to SC2, SC3 and SC4. The total cost of marketing in supply chain of marketing SC1, SC2, SC3 and SC4 was 0.79, 3.03, 3.39 and 7.69 Rs/kg (Figure 9). This fact is due to the cost of transportation (loading and unloading), electricity used and labor charges increase significantly as the number of intermediates increase in supply chain of marketing. The aggregate losses in the milk market between milk market value network Supply chain 1, 2, 3 and 4 fundamentally distinctive. The loss in milk market network SC1, SC2, SC3, and SC4 were 0.70, 1.15, 0.87, and 2.08 Rs/ kg. Therefore result clearly shows the aggregate market losses significantly incremented if the quantity of the middle people expanded in advertising supply chains. The aggregate net marketing edge was altogether more noteworthy in promoting production network SC1 in which two part maker and buyers were included in marketed value network. In marketing value chains SC2 and SC3 in which commission specialists and retailers were included in milk value chains. The general results plainly show that the milk marketing cost, promoting decreases with the expansion within the higher quantity of delegates in milk supply network, which thus diminishes the net benefit of maker and increments the purchaser cost. The impact of transportation, stacking and emptying, expense of food and grub, power, work and restorative costs on

promoting expense of milk in various market supply chains. The numerous relapse conditions comes about unmistakably demonstrate that transportation, stacking and emptying, expense of food and grain, work and therapeutic costs had significantly high impact on aggregate market cost.

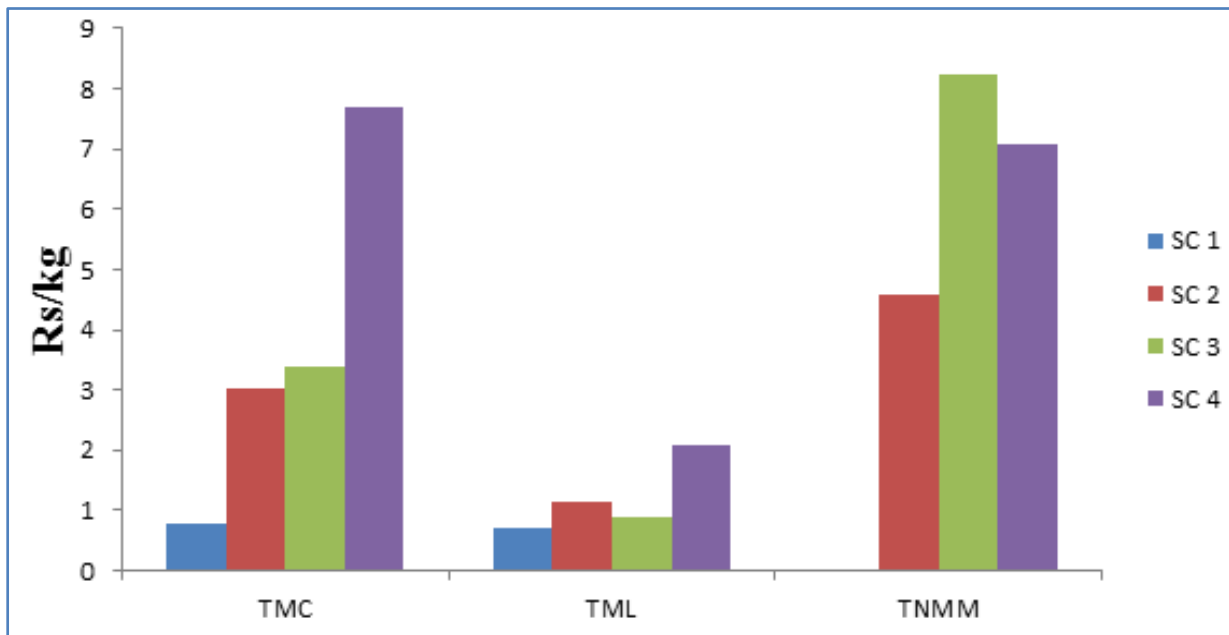


Figure 9 Total marketing cost (TMC), total marketing loss (TML), and total net marketing margin (TNMM)

3.9 Producer share in consumer price of fresh in different supply chain

Maker offer in purchaser cost for production network was different. Maker offer in purchaser cost for production network SC1 is higher as compare to SC2, SC3 and SC4. It is occur due to increasing number of intermediates. The result shows that producer shear in consumer price decreases due to increasing intermediates in milk value chain. In the milk value chain SC1 97.95% producer share in consumer price is higher as compare to SC2 80.35%, SC3 72.52% and SC4 64.89% 9(Figure 10).

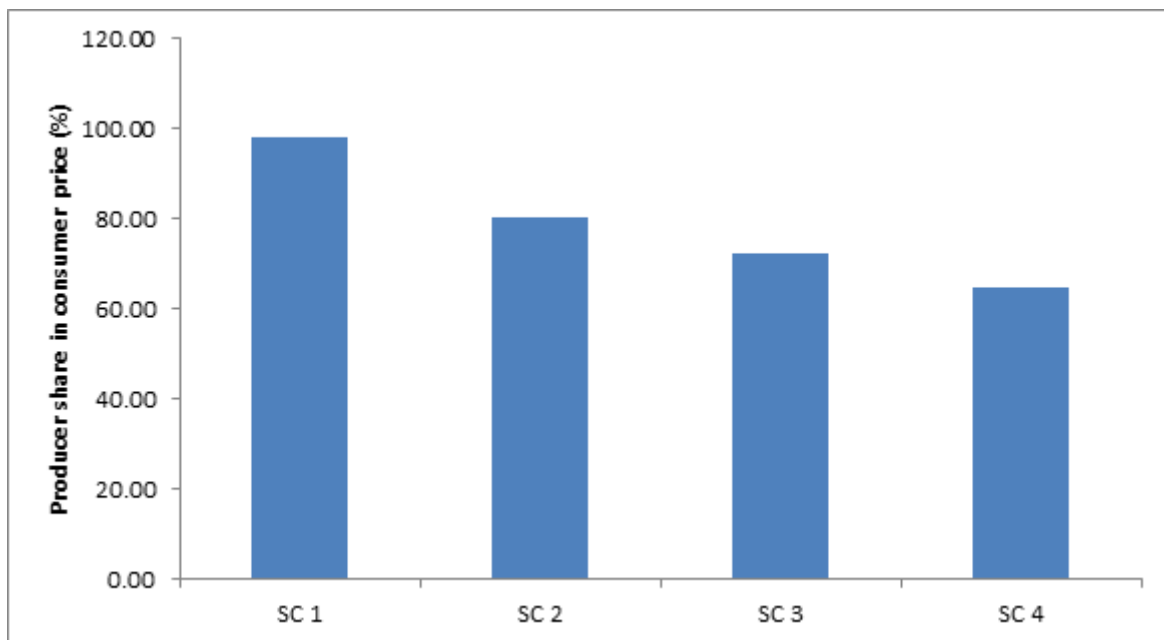


Figure 10 Fresh milk Producer share in consumer price in different supply chains

3.10 In different supply chain Market efficiency of milk

The market efficiency of different supply chain is different .the market efficiency of supply chain SC1 is greater as compare to SC2, SC3 and SC4.the result shows that the marketing efficiency decreases due to increases in

number of intermediates. The market efficiency in SC1 50.81 is higher as compare to SC2 4.78, SC3 2.84 and SC4 (Figure 11).

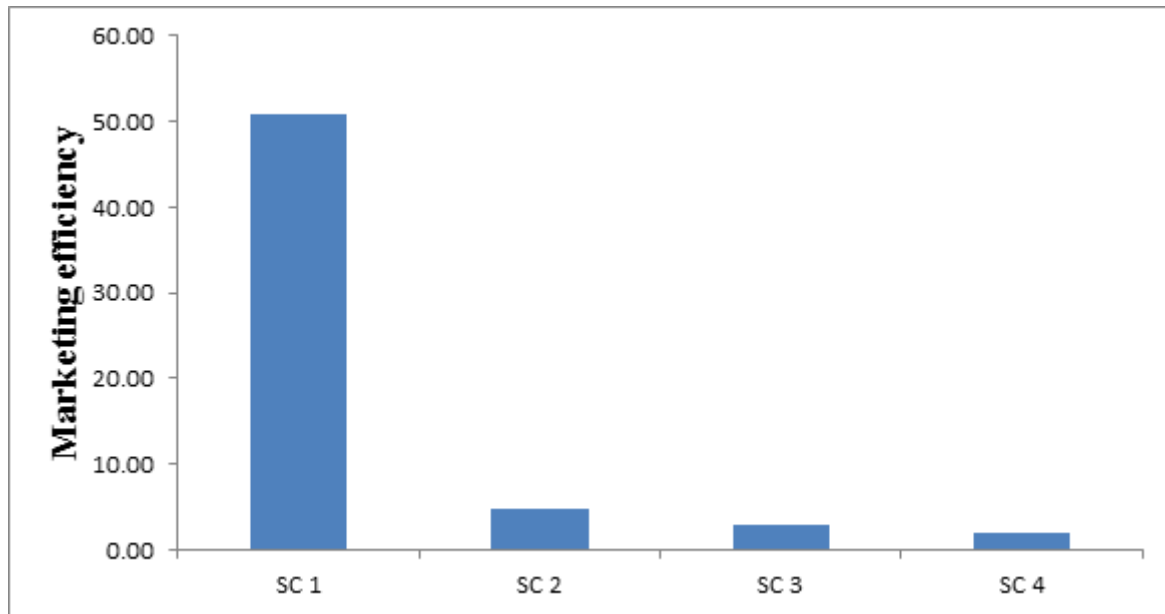


Figure 11 Market efficiency for fresh milk in different supply chains

IV. Conclusions

According to the objective of the present study, the survey was done in Allahabad district, Uttar Pradesh India to find the cost of production; return and marketing supply chain of fresh milk. Sixty eight milkman were interviewed in different supply chain to estimation cost of production. Four types of marketing supply chain (SC1: producer to consumer, SC2: producer to retailer to consumer, SC3: producer to commission agent to wholesaler to consumer, SC4: producer to dairy plant to retailer to consumer) were selected to study net margin of producer, marketing cost, marketing loss, marketing margin, marketing efficiency of producer share in consumer price in order to determine strategies for marketing of milk. 68 producer, 40 retailer, 20 commission agent, 20 wholesaler, 8 dairy plant were interviewed with the aid of well-structured questioner. On the basis my third objective a survey was also conducted to evaluate the consumer preference for traditional or modern milk supply chain. MS Excel 2007 and statistical package for social science (SPSS- 20) were used to analyze data.

- i. According to analysis the total marketing cost, total marketing loss and total net marketing margin of fresh milk was significantly greater for marketing supply chain SC4 as compare to SC3, SC2 and SC1. The consumer price for fresh milk was significantly lower in marketing supply chain SC1 than supply chain SC2, SC3 and SC4.
- ii. The marketing supply chain SC4 has significantly higher total marketing cost, total marketing loss and net marketing margin of fresh milk, followed by SC3, SC2 and SC1. The result shows that total marketing cost, total marketing loss and total marketing margin increase significantly with increase in number of intermediates in marketing supply chain. The most significant factor which influences the marketing cost of fresh milk were the feed and fodder charge and transportation cost.
- iii. On analysis of consumer preference of traditional or modern method of milk supply chain most of them 80% prefer traditional method which depend on various purchase variables. According to the observation the most important purchase variable for consumer to purchase fresh milk from producer, retailer and commission agent were price and quality.
- iv. From the survey it were observed that less selling place, bad transportation system, animal problem, feed and fodder, medical, high marketing loss; lack of marketing information, different problem in milk supply chain etc. were the major problem face by the producer. The main problem face by the retailers and wholesaler in marketing of fresh milk were lack of technical guidance, high marketing loss, high marketing price fluctuation and lack of coordination between producer and intermediates are the key problem face by the consumer for buying fresh milk from different supply chain were lack of grading facilities, lack of packaging and unhygienic condition.

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