SUMMARY AND CONCLUSION
Milk production in India is dominated small and marginal land holding farmers ad by landless who, in aggregate, own about 70 per cent of the National Milch animal herd. As crop production on 78 per cent of agricultural land still depends on rain, it is prone to both drought and floods, rendering agricultural income in certain for most farmers. India rank first in the world for milk production. During 2003-04, 110.5 million tonnes of milk was produced. Milk is the first animal food bestowed upon man by nature. It plays a unique role since ages because of its nutritional, religious and medicinal qualities and its over all merit as a food item of choice. Consumption of milk is uneven among the Indian population. According to recent estimates per capita availability of milk was 214 grams per day. Milk production has grown from 22.50 million tonnes in 1971-72 to 78.10 million tonnes in 1999-2000. Uttar Pradesh ranks first in the country in milk production during 2003-04, 18781. Total milk production the share of Uttar Pradesh remained 17.84 per cent of our country. India's in large milk production of rarely five states Uttar Pradesh, Rajasthan, Punjab, Andhra Pradesh and Gujarat. The necessary elements in 100 gram of milk, carbohydrate 5.2 gram, calcium 113 miligram, magnesium 10 milli gram, potassium 143 milli gram and vitamins A, B₁, B₂, B₁₂ and vitamin D etc. India ranks first both in bovine population and milk
production. The bovine population of the country is 286 million animals (206 million cattle and 80 million buffaloes). The production of milk overtime has shown tremendous increase and touched a level of 80 million tonnes in the recent past. In the recent past India has made rapid studies in milk production and presently in ranks first in the world, with production level of 84.5 million tonnes (Economic Survey of India, 2002). Milk production is increasing at one per cent per annum in the world, while in India it is increasing at more than 4 per cent. During one of the fastest growing enterprises in the country, achieving 7.4 per cent growth rate during 9th five year plan (All India Dairy Business Directory, 2001) since demand for milk and milk product is income elastic, consumption can improve only when the income of the producer increases alongwith increase in production. In India about about 46 per cent of milk produced is consumed in liquid farm. India’s dairy market is multi-layered, shape like a pyramid with the base made up of vast market for low cost milk. It is estimated that 20 per cent of the total milk produced in the country is consumed at the producer level and remaining is marketed through various co-operative, private dairies and vendor.

The Uttar Pradesh state occupies a prominent position on the milk map of the country. Total milk production in U.P. state during 2003-04 was about 86 lakh tonnes giving the per capita per day milk availability 246 grams as compared to 23 gram of the national average. About 67 per cent of the total milk production in the
state is produced by the farming sector, the remaining being contributed by landless and urban sector in the ratio of 21 and 7 per cent respectively.

The milk animal population was 46.74 million (20.65 cow and 26.09 million buffalo) and milk production 11.92 million tonnes in Uttar Pradesh. In Ambedkar Nagar district of Uttar Pradesh. The milk production was 8750.26 tonnes during 2004.05 (Parag Dairy Ambedkar Nagar) which is virtually the main source of additional income to the farmers.

Dairy co-operative have been considered one of the most important measures for the improvement in the marketing mechanism of milk in the rural areas by providing effective marketing facilities to the milk producers and enabling them to get remunerative prices for their milk. Dairy co-operative links the milk producers in the rural areas and the consumers in the distant urban areas. Keeping in view the above mentioned facts in mind, the proposed study entitled “Economics of production and marketing of milk in Ambedkar Nagar district of Uttar Pradesh” has been undertaken with the following main objectives.

Objectives:

1. To study the resource structure of sample households and to workout cost and returns of milk production.

2. To work out marketable and marketed surplus of milk and its determinants.
3. To estimate the marketing costs, margins and price spread in different marketing channels.

4. To analyse the resource use efficiency of milk production.

5. To identify the constraints in milk production and to suggest policy measures.

The research methodology of the study consisted of three stage random sampling technique selected of blocks, villages and farmers. Ambedkar nagar district was purposively selected. Two blocks namely Akabarpur Sadar and Tanda has been selected randomly with the criteria that both block has maximum number of buffalo and cross-bred animals. A list of the villages along with number of cross-bred animals, buffaloes and local cows. Ten village was randomly selected from set of villages, selected villages of farmers were classified into marginal (below 1 hectare), small (1-2 hectare), medium (2-3 hectare) and large (3 & above hectare) farmers respectively. Fifteen farmers are randomly selected in each village. Thus the study covers 75 villages from each block, was drawn for detail investigation.

The total number of milch animals was 436. among this the marginal category have 188, small 133, medium 68 and large farmers categories have 47 milch animals. Among 436 milch animals, according to number of animals under each categories, local cows were 81, cross-bred cows 166 and buffalo were 189, respectively.
The period of enquiry related to year 2003-04 for marketing purpose a suitable marketing network i.e. marketing channels, middleman, producers and consumers, cooperative societies etc. were present. The data were collected through investigation and by personally interviewing the livestock owners. Milk yield was recorded for the whole lactation period for each milch animals separately.

The study effect of various factors on milk production in (Rs.) in case of milk co-operative societies members in annual in different categories. Simple & multiple regression was carried out, model was tried i.e. simple and multiple regression.

a. Linear model

\[ Y = a + \sum_{i=1}^{n} b_i x_i + u \]

b. Coub-Dugolas model

\[ Y = a \sum_{i=1}^{n} x_i^b e^u \]

Where

Y = Dependent variable

Xi = Explanatory variables

n = total number of explanatory variables

a = constant term

bi = Regression coefficient associated with explanatory variables Xi's
Random error term which is assumed to follow normal distribution with zero mean and constant variance

**Analytical framework:**

**(a) Milk production function:**

The multiple regression analysis was used to study the relationship between returns from milk and different factors influencing it. The specification of milk production function used in the present study is as follows:

\[ Y = f(X_1, X_2, X_3, X_4, X_5, D_1, D_2, D_3) \]

Where:

- \( Y \) = Value of milk produced per animal per day (Rs.)
- \( X_1 \) = Value of green fodder fed per animal per day (Rs.)
- \( X_2 \) = Value of dry fodder fed per animal per day (Rs.)
- \( X_3 \) = Value of concentrate fed per animal per day (Rs.)
- \( X_4 \) = Value of labour employed per animal per day (Rs.)
- \( X_5 \) = Value of veterinary services per animal per day (Rs.)

Three seasonal dummy variables were introduced as follows:

- \( D_1 \) = Winter season
- \( D_2 \) = Summer season
- \( D_3 \) = Rainy season
(b) Milk marketed surplus function:

The multiple regression analysis was to study the relationship between marketed surplus of milk and various factors affecting it. The specification of marketed surplus function of milk used in the present study as follows:

\[
Y = f(X_1, X_2, X_3, X_4, X_5, D_1, D_2, D_3)
\]

Where

\[Y\] = Marketed surplus of milk per household per day (Liters)

\[X_1\] = Milk production per household per day (Litres)

\[X_2\] = Family size of producer household

\[X_3\] = Weighted average price of milk per litre (Rs.)

\[X_4\] = Educational score of the earners of households

\[X_5\] = Size of operational land holding (hectares)

Pooled marketed surplus functions were fitted using seasonal dummies.

Three season dummy were introduced as under.

\[D_1\] = Winter season

\[D_2\] = Summer season

\[D_3\] = Rainy season

Chow’s test:

It was employed to test the hypothesis whether marketed surplus function of member and non-member group are statistically different as per
the procedure given earlier in section (a) milk production function. In order to know the variables responsible for difference between two functions of member and non-member. The functional analysis was carried out using constant and slope dummies. The model for the purpose is stated as under:

\[ Y = b_0 + b_1 x_1 + b_2 x_2 + b_3 x_3 + b_4 x_4 + b_5 x_5 + b_6 (D_{b0}) + b_7 (D_{x1}) + b_8 (D_{x2}) + b_9 (D_{x3}) + b_{10} (D_{x4}) + b_{11} (D_{x5}) + U \]

Where, the variables \( Y, x_1, x_2, x_3, x_4, x_5 \) are same as defined earlier. The Dummy variables is defined as under:

\( D = 1 \) for member group and \( D = 0 \) for non member group.

The total geographical area of the district Ambedkar Nagar was 4164 sq. kms. And the total area under block Akbarpur Sadar 21462 hectares and Tanda block area was 24116 hectares respectively. The cropping intensity of district and blocks worked out 175.38, 109.85 and 104.99 per cent of cropping intensity respectively during the study period. The total population of district was 736268, males 3997.84 and females 339484. The population of Akbarpur and Tanda block were 127464, males 68785 and female 58679 and for Tanda block total population was 182793, males 101376 and female 81417 respectively for both the blocks of district Ambedkar Nagar.

The district Ambedkar Nagar and Block Akbarpur and Tanda had the 1239897, 51488 and 49361 total population of livestock respectively.
Ambedkar Nagar district came under the purview of milk co-operative societies development scheme. The milk co-operative societies programme is being run by the national dairy development board in the line of ‘Anand Pattern’ dairy co-operative societies. It has three tier structure:

1. **Village level**: Primary milk producers co-operative societies

2. **District level**: Ambedkar Nagar milk producers co-operative societies

3. **State level (apex body)**: Uttar Pradesh Co-operative Dairy Federation.

The primary milk producers co-operative societies consists of individual members at village level and managed by the selected representative of milk producers co-operative unions. District level union consists of primary milk producers. Co-operative Societies and managed by union staff and supervised by the Uttar Pradesh Co-operative Dairy Federation at state level. The member of milk co-operative societies in category of households was proportion to their population in each village. The period of enquiry related to year 2003-04 for marketing purpose, a milk co-operative societies marketing channel i.e. milk producer ➔ Milk co-operative societies ➔ co-operative milk plant ➔ consumer were used in the study. Milk yield was recorded for the whole lactation period for each milch animal separately. The primary data were collected by survey technique with the help of pre-tested schedule while relevant secondary data were collected from government publications. Tabular and statistical analysis of collected data were worked out. The main
green fodder berseem, agota, oat, green mustard and sugarcane top in winter season. Maize, jowar chari, M.P. chari, green grasses were main green fodder and rainy season. The main dry fodder was wheat bhusa which was supplied in all seasons, while paddy straw (pual) was fed more in winter and less in summer season. The concentrate were fed wheat choker, gram chunni, Arhar chunni, Ricebran, oil cakes of all seasons. The mineral material fed were salt, calcium, gur etc for all the general features of the sampled form indicates that the overall average family size was 5.20 members. The overall average literacy percentage 64.62 and the overall average of land holding was 1.50 hectare. The general features of milch animals was 21.22%, 40.41% and 38.37% on local cow, cross-bred cow and buffalo respectively.

It was observed that total maintenance for buffalo per day was highest Rs. 51.65 as compared to local cow Rs. 41.26 and cross-bred cow Rs 46.91 respectively during the winter season. The total fodder cost accounted for 33.51 per cent, 34.58 per cent and 34.35 per cent for the total cost of local cow, cross-bred cow and buffalo respectively. The concentrate cost was 39.98 per cent, 40.40 per cent and 41.82 per cent for local cow, cross-bred cow and buffalo households respectively. Other charges accounted for 27.22 per cent for local cow, 25.28 per cent for cross-bred cow and 23.89 per cent for buffalo, respectively.
In summer season total maintenance cost for buffalo per day was highest Rs. 58.53 as compared to local cow Rs. 43.81 and cross-bred cow Rs. 51.68 respectively. The total fodder cost accounted for 32.12 per cent, 28.95 per cent and 30.96 per cent for local cow, cross-bred cow and buffalo respectively. The concentrate cost was 40.31 per cent, 43.32 per cent and 37.93 per cent in local cow, cross-bred cow and buffalo respectively. Other charges accounted for 27.21 per cent for local cow, 27.77 per cent for cross-bred cow and 31.07 per cent for buffalo respectively.

In rainy season, total maintenance cost per day per animal was estimated as Rs. 43.37 for local cow, Rs. 46.57 for cross-bred cow and Rs. 53.79 for buffalo respectively. The fodder cost accounted for 32.90 per cent, 32.04 per cent and 33.39 per cent for local cow, cross-bred cow and buffalo respectively. The concentrate cost was found 40.03 per cent, 41.17 per cent and 40.58 per cent for local cow, cross-bred cow and buffalo respectively. The other charges accounted for 27.05 local cow, 26.75 per cent for cross-bred cow and 26.00 per cent for buffalo respectively.

The total analysis that the annual per lactation over all average maintenance cost was found for local cow Rs. 11516.30 Rs. 12494.35 for cross-bred cow and Rs. 15303.32. The fodder cost accounted for 33.80 per cent, 32.56 per cent and 31.91 per cent for local cow, cross-bred cow and buffalo respectively. The concentrate cost was found 38.21 per cent for local cow, 38.30

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per cent for cross-bred cow and 39.51 per cent for buffalo. The other charges
cost was accounted for 22.15 per cent for local cow, 22.22 per cent for cross-
bred cow and 20.97 per cent for buffalo respectively.

The cost of milk production per litre and milk production per milch
animal much higher in case of buffalo other than cross-bred cow and local cow.
The per litre cost of milk production for local cow accounted Rs. 7.60, Rs. 7.51
and Rs. 7.50 for respective categories. In the case of cross-bred cow Rs. 6.46,
Rs. 6.49, Rs. 6.44 and Rs. 6.50 in respect of size groups marginal, small,
medium and large households respectively. Further, in the case of buffalo per
litre cost of production observed Rs. 7.16, Rs. 7.30, Rs. 7.53 and Rs. 7.60 for
respective size of group.

The overall average returns per milch animals per day and each season
was 1:1.26, 1:1.46 and 1:1.49 during winter season, 1:1.22, 1:1.31 and 1:1.29 in
summer season, 1:1.19, 1:1.50 and 1:1.43 in rainy season for local cow, cross-
bred cow and buffalo respectively. The net profit in case of buffalo was higher as
compared to local cow and cross-bred cow.

On an overall input-out put ratio in milch local cow, cross-bred cow and
buffalo was observed 1:1.22, 1: 1.40 and 1:1.41 respectively. In the case of local
cow, input output ratio observed 1:1.21, 1:1.23, 1:1.21 and 1:1.43 on marginal
farmers, small farmer, medium farmers and large farmers categories of
household respectively. In the case of cross-bred cow input-output ratio was
highest on the size group of marginal 1:1.34 followed by 1:1.40 on small, marginal 1:1.41, followed by 1:1.40 small, 1:1.40 medium, 1:1.34 large households respectively. Further, it was observed in the case of buffalo input-output ratio was highest on the size group of marginal 1:1.44 followed by 1:1.42, 1:1.38 and 1:1.37 for small medium, large households respectively. Some ratios were found in different size group for milch animals. That are profitable to the member of co-operative societies in the study area, and boost the life style of the respondents.

Therefore, it can be concluded from above results the profitability, economic viability was more in case of buffalos compared to local and cross-bred cows respectively.

The break even point was worked out to be 7.81, 8.00, 7.94 and 7.23 per cent of the total milk yield on marginal, small, medium and large groups of milch local cows respectively. In the case of cross-bred cow, the break even output was observed 7.18, 7.65, 8.14 and 8.06 per cent of the total milk yield on marginal, small, medium and large group of households respectively. It was further observed in the case of buffalo, the break even output was found 7.26, 8.14, 8.07 and 7.94 per cent of the total milk yield on marginal, small, medium and large group of households respectively. On an overall average the break even point output was found to be 7.75 per cent on local cow, 7.76 per cent on cross-bred cow and 7.85 per cent on buffalo, respectively.
It was observed that on an overall average taking all the size group together, the daily milk production per households was worked out to 8.21 litres, out of which 6.00 litres and 5.74 litres was sold, representing marketable and marketed surplus of 95.66 per cent to marketable surplus to marketed surplus in the study area. It was observed that out of 150 milk producer 70 (46.36 per cent) were using channel IV and sold 612.94 litres by the channel. They contributed 26.67 per cent to the total milk sold 40 milk producer (28.88 per cent) using channel II and sold 392.71 litre of milk per day by this channel. It is also contributed 16.79 per cent to total milk sold, 25 milk producer (16.67 per cent) were using channel I and sold 22.06 litres of milk per day in this channel, they accounted 8.64 per cent of the total milk sold, 15 milk producer (10.00 per cent) were using channel III and sold 112.90 litres of milk per day by this channel. They accounted 8.64 per cent of the total milk sold.

In this investigation reveals that channel IV which was used by large member of milk producers (46.36 per cent) was more effective channels than other on the hand the channel III which was used only 8.64 per cent of milk producer was not popular among the farmers.

It was observed that producer's share in consumer's rupee was maximum in I channel. Because there was no middlemen in this channel. In II channel the producer's share in consumer's rupee was 81.10 and 83.84 per cent was lower than channel I, while marketing charges incurred by middleman was 3.56 and
The result of chow’s test clearly indicated the marketed surplus functions for member and non-member groups differed significantly (P<0.01). In order to know the variables responsible for difference between the functions of member and non-member groups. Further analysis was carried out by fitting a marketed surplus function on the polled data of member and non-member households. A close perusal revealed that the coefficient of slope dummy for milk production was found to be statistically significant (P<0.01) which implied that milk production was responsible for relatively higher marketed surplus of milk in member group as compared to non-member group. It may, therefore, be concluded that dairy co-operatives could succeed in increased milk production on the member households.