Journal of Experimental Agriculture International

44(9): 188-194, 2022; Article no.JEAI.89464
ISSN: 2457-0591
(Past name: American Journal of Experimental Agriculture, Past ISSN: 2231-0606)

Estimation of Marketed Surplus and Constraints in Production and Marketing of Milk in Visakhapatnam District of Andhra Pradesh

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JEAI/2022/v44i930865

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/89464

Original Research Article

Received 29 April 2022
Accepted 13 July 2022
Published 13 July 2022

ABSTRACT

The present study entitled "Estimation of marketed surplus and constraints in production and marketing of milk in the Visakhapatnam district of Andhra Pradesh" was undertaken to know about Marketed surplus, marketing channels, and problems in the production and marketing of milk. The study has been undertaken in Paravada mandal of Visakhapatnam district of Andhra Pradesh during the Agricultural year 2021-2022. A total of 100 respondents were analyzed and data is interpreted. And respondents were categorized into three groups based on the number of milch animals. The overall average milk production is 19087.68 liters. The total quantity of milk production is 54389.21 liters. Out of this, family consumption is 957.95 liters, the marketable surplus is 18129.73 liters and the marketed surplus is 18129.73 liters with 5.0, 95.0, and 95.0 percent respectively. The total marketed surplus is 54389.21 liters with a value of Rs. 2387503.05. Lack of technical guidance for farmers, high cost of crossbreed animals, and lack of credit facilities are major problems in the production category. Less knowledge about marketing strategies and lack of technical guidance are the major marketing constraints faced by farmers in the study area. Some measures suggested to farmers and policymakers are there is a need for training for farmers regarding the dairy farming and

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how they attain the maximum profits from this sector, Dairy co-operative societies, and Cooperative milk plants should come together and provide incentives for the farmers. Institutional sources should provide easy way loans to farmers without any collateral. And with fewer interest rates.

Keywords: Cooperative milk plant; dairy cooperative societies; family consumption; marketable surplus; marketed surplus.

1. INTRODUCTION

Dairy farming is an integral part of Indian agriculture even history is telling that domestication of cattle is not a new thing as it dated back 8000 years with zebu cattle. But by the Indus valley civilization, only zebu cattle are fully domesticated and used for milk production. At present, India ranked 1st in milk production among all the countries in the world contributing 23 percent of global milk production. From 2019 to 2020, the world's milk production rose by 2 percent reaching 906 million tonnes, where all the geographical regions showed increased milk production except the African region, where the milk production is stable. Among all the countries in the world, India is having highest milk production followed by the United States of America, Pakistan, China, Brazil, Germany, the Russian Federation, and France (World food and Agriculture-Statistical yearbook-2020). India's giant step to increase milk production is the "White Revolution" and this turned the country from a milk deficient to a milk surplus. The milk production of India has 146.31 million tonnes to 209.96 million tonnes from 2014-15 to 2020-21 with an annual compound rate of 6.2 percent. The per capita availability of milk in India is 427 grams per day in 2020-21 (Economic survey 2021-22). Dairy is one of the largest agricultural commodities which is contributing the 5 percent national economy. The Government is implementing various schemes and policies to improve the production and quality of milk but the reach of these to the rural population is very less. The flow of milk from producer to consumer involves some middlemen and intermediaries. And the Producer will be having a different interest in giving milk to different persons. Likely farmers may provide the milk for middlemen or cooperative societies or consumers to maximize their profits. Andhra Pradesh is India's agriculturally well-developed state. Mixed cropping and livestock farming is one the important farming system followed by 80 percent of rural households in the state. In Andhra Pradesh, According to the 20th livestock census, the exotic cattle are 19,38,871 and the Indigenous cattle are 14,41,287 in numbers. Milk production for the year 2018-19 is 15,044(000 tonnes) (National dairy development board) and the per capita availability of milk is 623 grams per day in 2019. The important problem that was faced by milk producing farmers is lack of technical guidance and they don't have any knowledge about market strategies. Even though most of the farmers are opting for dairy farming they are not only dependent upon the single enterprise but along with this, they are doing mixed farming which leads to diversification of time and labour resources [1-4].

2. RESEARCH METHODOLOGY

2.1 Locale of the Study

Visakhapatnam is known as the "Jewel of the East Coast". It is the financial capital of the state. The coastline length is 132 km on the coast of the Bay of Bengal. It has an area of 682 square kilometers which makes it the largest city in the state. It is situated between the Eastern Ghats and the Bay of Bengal. The district coordinates lie between 17.7041°N and 83.2977°E. The district is sharing boundaries with Vijayanagaram in the north, Orissa in the West, Bay of Bengal in the east, and East Godavari in the south.

2.2 Sampling Design

Multi-stage purposive random sampling technique was used to select the district, Mandal, villages, and farmers [5-11].

2.3 Selection of District

Out of 13 districts in the state of Andhra Pradesh, One district named Visakhapatnam was selected purposively as this research is timely bounded. And Visakhapatnam is selected because there is a lot of potential for agriculture in this district which needs to be exploited.

2.4 Selection of Mandal

A list of all the mandals in the district was prepared and one Mandal namely Paravada was selected purposively.

2.5 Selection of Villages

A list of all villages of the selected Mandal was prepared based on the number of cattle reared in the region and arranged in ascending order and the top five villages were selected namely Paravada, Cheppurupalli, Naidupalem, Muthyalamapalem, and Kalapaka.

2.6 Selection of Sample Respondents

A list of all the farmers involved in milk production in the selected villages was prepared. Further, these farmers were divided into three groups based on the number of milch animals viz.,

a) Small farmers (up to 2 milch animals)
b) Medium farmers (3-4 milch animals)
c) Large farmers (above 4 milch animals)

Samples of 20 respondents from each selected village were taken randomly, making a total sample of 100 farmers. Thus, the study was based on an intensive inquiry of 100 farmers selected randomly from 5 villages of the Paravada mandal of Visakhapatnam district.

2.7 Methods of Data Collection

2.7.1 Method of inquiry

1) Primary data: Primary data was collected from the farmers by interviewing them personally with the help of a pretested schedule.
2) Secondary data: Secondary data was collected from various sources like journals, articles, books, magazines, and particular websites apart from this data is collected from government offices like mandal offices, village panchayats, and veterinary offices.

2.7.2 Period of inquiry

The study is conducted during the agricultural year 2021-2022.

2.7.3 Analytical tools and concepts used

The following statistical formula was used for data analysis which are given below:

1. The weighted average of the variable x was calculated by using the following formula.

$$\text{Weighted average} = \frac{\Sigma W_i X_i}{\Sigma W_i}$$

Where,
W_i = Weight assigned
X_i = Value of the variable

Along with this tabular analysis is used to analyze the data.
2. Marketable surplus is the difference between the total production of the produce and requirements of the farmer from the output.

$$\text{Marketable Surplus (MS)} = P\text{-}C$$

P = Total production
C = Total requirements Farmers requirements for consumption and others

3. Marketed surplus is the produce which actually farmers sells in the market irrespective of the requirements.
4. To find the constraints faced by the milk producers Garrett Ranking technique is used.

$$\text{Percent position} = \frac{100(R_{ij}-0.5)}{N_j}$$

Where,
Rij = Rank given for the ith variable by jth respondents
Nj = Number of variable ranked by jth respondents

3. RESULTS AND DISCUSSION

3.1 Marketing Channels Involved in the Marketing of Milk

3.1.1 Disposal of milk

The total milk production, family consumption, marketable surplus, and marketed surplus of different groups per household are presented in Table 2, the overall average milk production is 19087.68 liters, out of this family consumption is 957.95 liters, the marketable surplus is 18129.73 liters and marketed surplus is 18129.73 liters with 5.0, 95.0, and 95.0 percent respectively. The total milk production in the small farmers is 5953.70 liters, among this family consumption is 658.95 liters, the marketable surplus is 5294.78 liters, and the marketed surplus is 5294.78 liters with 11.1, 88.9, and 88.9 percent respectively. The total milk production in the medium farmers is 12158.58 liters, among this family consumption is 957.24 liters, the marketable surplus is 11201.34 liters, and the marketed surplus is 11201.34 liters with 7.9, 92.1, and 92.1 percent respectively. The total milk production in the large farmers is 39150.77 liters, among this

Table 1. Distribution of selected sample respondents in different groups

S.No	Village	Small farmers	Medium Farmers	Large farmers
1.	Paravada	10	7	3
2.	Cheppurupalli	12	6	2
3.	Naidupalem	10	7	3
4.	Muthyalamapalem	12	7	1
5.	Kalapaka	11	7	2
Total		**55**	**34**	**11**

Table 2. Total milk production, family consumption, marketable surplus, and marketed surplus of different groups per household (in liters) (n=100)

S.No	Size of Household	Milk production	Family consumption	Marketable surplus	Marketed surplus
1.	Small	5953.70 (100)	658.95 (11.1)	5294.78 (88.9)	5294.78 (88.9)
2.	Medium	12158.58 (100)	957.24 (7.9)	11201.34 (92.1)	11201.34 (92.1)
3.	Large	39150.77 (100)	1257.68 (3.2)	37893.09 (96.8)	37893.09 (96.8)
Overall average		19087.68 (100)	957.95 (5.0)	18129.73 (95.0)	18129.73 (95.0)

(Figures in the parentheses indicate percentages.)

family consumption is 1257.68 liters, the marketable surplus is 37893.09 liters, and the marketed surplus is 37893.09 liters with 3.2, 96.8, and 96.8 percent respectively. The marketable surplus of large farmers is high when compared to small and large farmers because large farmers are retaining a small quantity of milk for family consumption and the size of the family is also responsible for the quantity of milk that is available for sale which is marketed surplus.

3.2 Identification of Marketing Channels

There are different marketing channels identified in the marketing of milk in the study area, and there are different market intermediaries, middlemen, and different agencies involved in the marketing channels. Both buffalo milk and cow milk are having the same marketing channels in the marketing of milk as mentioned below.

Channel - I: Milk Producer - Consumer
Channel – II: Milk Producer – Milk vendor – Consumer
Channel – III: Milk Producer – Co-operative society – Co-operative plant – Consumer

A detailed explanation of the marketed surplus and Value of milk through the various marketing channels is given in Table 3. The total marketed surplus is 54389.21 liters with a value of Rs. 2387503.05. Among the 100 farmers, 23 farmers are selling their milk through marketing channel-I with a marketed surplus of 12509.47 liters with a value of Rs. 614965.54. And 34 farmers are selling their milk through marketing channel-II with a marketed surplus of 18492.26 liters with a value of Rs.813659.44. And 43 farmers are selling their milk through channel-III with a marketed surplus of 23387.27 liters with a value of Rs.958878.07. The value of milk is decreasing even though the quantity of milk is increasing.

The disposal pattern of milk under the different sizes of marketing channels per lactation period is given in Table 4. The total quantity of milk production is 54389.21 liters, among this small farmers are contributing 5294.78 liters, medium farmers are contributing 11201.34 liters and large farmers are contributing are 37893.09 liters with 9.7, 20.6 and 69.7 percent respectively In channel-I, the total quantity of milk is 12509.47 liters, among this small farmers are contributing 891.56 liters, medium farmers are contributing 2236.11 liters and large farmers are contributing are 9381.80 liters with 7.1, 17.9 and 75.0 percent respectively. In channel-II, the total quantity of milk is 18492.26 liters among this small farmers are contributing 1856.44 liters, medium farmers are contributing 3965.16 liters and large farmers are contributing are 12670.66 liters with 10.0, 21.4, and 68.6 percent respectively. In channel-III, the total quantity of milk is 23387.27 liters among this small farmers are contributing 2546.78 liters, medium farmers are contributing 4999.07 liters and large farmers are contributing are 15843.42 liters with 10.9, 21.4, and 67.7 percent respectively. The marketed surplus of all farmers is 54389.21 liters, among this disposal of milk through channel- I is 12509.47 liters, through channel-II is18492.26 liters and through

Table 3. Marketed surplus and value of milk through the various marketing channels (n=100)

S.No	Channels	Total number of households				Marketed surplus in liters	Value in Rupees
		Small	Medium	Large	Total		
1.	I	12	8	3	23	12509.47	614965.54
2.	II	18	12	4	34	18492.26	813659.44
3.	III	25	14	4	43	23387.27	958878.07
Total		**55**	**34**	**11**	**100**	**54389.21**	**2387503.05**

Table 4. Disposal pattern of milk under the different sizes of marketing channels per lactation period. (In liters) (n=100)

S.No	Size of households	Channel-I	Channel -II	Channel -III	Total Quantity in liters
1.	Small	891.56 (7.1)* (16.8)**	1856.44 (10.0)* (35.1)**	2546.78 (10.9)* (48.1)**	5294.78 (9.7)* (100)**
2.	Medium	2236.11 (17.9)* (19.9)**	3965.16 (21.4)* (35.4)**	4999.07 (21.4)* (44.7)**	11201.34 (20.6)* (100)**
3.	Large	9381.80 (75.0)* (24.7)**	12670.66 (68.6)* (33.5)**	15843.42 (67.7)* (41.8)**	37893.09 (69.7)* (100)**
Total quantity in liters		**12509.47 (100)* (22.9)****	**18492.26 (100)* (33.9)****	**23387.27 (100)* (43.2)****	**54389.21 (100)* (100)****

(Figures in the parentheses indicate percentages.)

Table 5. Production constraints (n=100)

S.no	Constraints	Percentage	Rank
1.	Lack of technical guidance	72.90	1st
2.	High cost of crossbreed animals	68.67	2nd
3.	Lack of credit facilities	63.18	3rd
4.	High cost of fodder	61.63	4th
5.	Low incentives	56.62	5th
6.	Transportation problem	46.70	6th
7.	Labour problem	34.29	7th
8.	Delay in payment of milk	33.67	8th
9.	High charges of cattle insurance	32.84	9th
10.	High charge for veterinary services	27.50	10th

Table 6. Marketing constraints (n=100)

S.No	Constraints	Percentage	Rank
1.	Less knowledge about marketing strategies	66.15	1st
2.	Lack of technical guidance	63.20	2nd
3.	No or less provision for advances for milk by society	53.85	3rd
4.	Stiff competition	35.35	4th
5.	Improper weighment	31.45	5th

channel-III is 23387.27 liters with 22.9, 33.9 and 43.2 percent respectively. The marketed surplus of small farmers is 5294.78 liters, among this disposal of milk through channel- I is 891.56 liters, through channel-II is 1856.44 liters and through channel-III is 2546.78 liters with 16.8, 35.1 and 48.1 percent respectively. The marketed surplus of medium farmers is 11201.34 liters, among this disposal of milk through channel- I is 2236.11 liters, through channel-II is

3965.16 liters and through channel-III is 4999.07 liters with 19.9, 35.4 and 44.7 percent respectively. The marketed surplus of large farmers is 37893.09 liters, among this disposal of milk through channel- I is 9381.80 liters, through channel-II is 12670.66 liters and through channel-III is 15843.42 liters with 24.7, 33.5 and 41.8 percent respectively.

3.2.1 Constraints in production and marketing faced by milk producers production constraints

In Table 5, the problem faced by the milk producers in the production category has been tabulated and ranks were given based on the opinion of the respondents. 1st rank is given to lack of technical guidance with a 72.90 percent score, 2nd rank is given for the high cost of crossbreed animals with 68.67 percent score, 3rd rank is given for lack of credit facilities with 63.18 percent score, 4th rank is given for the high cost of fodder with 61.63 percent score, 5th rank is given for low incentives with 56.62 percent, 6th rank is given for transportation problem with 46.70 percent, 7th rank is given for labour problem with 34.29 percent, 8th rank is given for the delay in milk payments with 33.67 percent, 9th rank is given for the high charge of cattle insurance with 32.84 percent and 10th rank is for the high charge of veterinary services with 27.50 percent. Farmers are not having support from the dairy co-operative society and milk plants and they are lacking the technical guidance for doing the advanced dairy milk production, in the survey also it is clearly noted, Cost of crossbreed animals is one of the major problems in the study area and their availability is also a problem. Getting a loan from institutional sources is a tedious process and farmers are facing issues in the study area. The cost of fodder and its availability is also a concern in the study area, the government is providing subsidies but farmers are not able to reach the source. Low incentives from the co-operatives are a problem. Transportation of milk requires special attention as it is a perishable product. Availability of labour is a concern for large farmers. Delay in milk payments is a minor problem, cattle insurance, and veterinary services are a minor problem.

3.3 Marketing Constraints

In Table 6, Marketing constraints faced by the respondents have been tabulated and ranks were given accordingly. 1st rank is given for less knowledge about marketing strategies with 66.15 percent score, 2nd rank is given for lack of technical guidance with 63.20 percent score, 3rd rank is given to no or less provision for advances for milk by society with 52.85 percent score, 4th rank is given to stiff competition with 35.35 percent and 5th rank is given to improper weighment with 31.45 percent score. Farmers don't have knowledge about the marketing strategies because they are giving milk to various channels with less profit also and even though they know that they will get high profits in the channel-I but some farmers are giving milk to channel-III and in the marketing also farmers are lacking the technical guidance, Co-operative society is not providing any advances for the milk producers this may be because lack of confidence about the production and marketing of milk and there is stiff competition between the milk vendor in the study area to gain the maximum profits and they have to find the consumers throughout the year. And improper weighment is a minor problem as these days it is every weight is measured by the electronic ways.

5. CONCLUSION

The study on the estimation of marketed surplus and constraints in the production and marketing of milk in the Visakhapatnam district revealed that there is a need for more attention to milk production as there are major chances for increasing the production value. Marketed surplus is 54389.21 liters with value of Rs.2387503.05. Even though farmers know that they can gain a lot of margin when they sell their milk produce to consumers directly, but most of the farmers are not doing so, the main reason for this farmers believe in co-operative society even though they are giving less price to farmer. Among the production constraints, 1st rank is given to Lack of technical guidance. Among the marketing constraints, 1st rank is given less knowledge about marketing strategies. There is need to boost up the women dairy farmers which is practically possible by giving the trainings to farmers. Dairy cooperatives should come together and provide incentives to the farmers. Government should make sure that availability of fodder throughout the year. The farmers should target the Channel-I for obtaining the more profits.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/89464