Assessment of Market Structure and Marketing Efficiency of Piggery Enterprise in Bengaluru

P. K. Raghavendra, M. S. Ganapathy and Siddayya

Institute of Agri-business Management, College of Agriculture, UAS, GKVK, Bengaluru - 560 065

e-Mail : raghavscholar65@gmail.com

Authors Contribution

P. K. Raghavendra :
Conceptulization, data collection data analysis, tabulation of results and manscript preparation;

M. S. Ganapathy:
Conceptulization, supervision, data analysis and drafting manuscript;

Siddayya :
Data curation and draft correction

Corresponding Author :
P. K. Raghavendra

Abstract

The present study assess the market structure and efficiency of piggery industry in Bengaluru. Total sample size of 35 pig farmers *i.e.,* 5 pig breeders and 30 pig fattening farmers were selected for the study from Bengaluru Rural and Bengaluru Urban districts. Different marketing channels for the disposal of piglets, live animals and pork were examined by selecting a sample of 40 middlemen and 120 consumers. Shepherd's and Acharya's methods were used to calculate the marketing efficiency of piggery farming. The marketing channels for piggery in the study area involved four major intermediaries, *viz.,* farmers, breeders, traders, processors and retailers. In the case of piggery farming, three channels were prevalent, *viz.,* Channel I: Farmers - Consumer; Channel II: Farmers - Traders - Retailers / Butchers - Consumers; Channel III: Farmers - Traders - Processors - Retailers - Consumers. Marketing efficiency was found higher in Channel I among Piggery Farmers as well as breeders. All the farmers in the study area were found to be selling pigs in unregulated markets. The study also highlighted the major marketing constraints faced by different stakeholders in marketing of pigs. Thus, this study provides valuable insights and information that can benefit various stakeholders involved in the piggery industry and drive positive change in the sector.

Livestock serves as an indispensable component of the agricultural landscape in India, contributing significantly to the growth and development of the agricultural sector. Its multifaceted impact encompasses several vital aspects. livestock plays a pivotal role in enhancing food and nutritional security by providing nutrient-rich food products. Simultaneously, it acts as a critical source of employment and income, offering a buffer against the adverse effects of crop failures. Furthermore, livestock supplies essential draft power and valuable manure for crop production activities, making it an integral part of the agricultural value chain.

Pork is the most consumed meat globally. However, in India, consumption of pork is limited to few regions of the country. In India, as per 20th Livestock census, the total Pig population is 9.06 million. Pigs stand out in terms of their potential to provide rapid economic returns to farmers due to inherent traits such as high fecundity, efficient feed conversion, early maturity, and a short generation interval. Notably, pig farming demands relatively modest investments in infrastructure and equipment. This sector holds immense promise for ensuring both nutritional and economic security for vulnerable sections of society (Akriti *et al.,* 2023).

As per the 20th Livestock Census, the distribution of the pig population across districts in Karnataka highlights Kalaburagi district with the highest percentage share at 13.66 per cent, followed by Bengaluru Urban (8.66 %), Belagavi (6.73 %), Bidar (6.43 %), Yadgir (6.33 %), Bagalkot (6.32 %),

Vijayapura (6.01%) and Raichur (5.06%). The remaining districts collectively contribute less than 5 per cent each to the state's total pig population. Notably, Uttara Kannada district holds the lowest position with only 0.37 per cent of the state's pig population. This distribution pattern underscores varying concentrations of pig farming activities across Karnataka's districts, with certain regions holding considerably larger shares compared to others.

Pig farming in India has undergone a significant transformation in recent years. In the past, it was associated with lower social status and was primarily undertaken by socially disadvantaged communities. However, perceptions have evolved and commercial pig farming is no longer limited to lower-income groups. People now recognize the economic value of pig farming, making it a viable enterprise. The present study undertaken to assess the market structure and marketing efficiency of piggery enterprise in the study area.

METHODOLOGY

The study was carried out using multi-stage random sampling technique, to draw the samples from the study area. The first stage, constituted with selection of villages from Bengaluru Rural district and Bengaluru Urban district. Further, in the second stage, list of piggery farms in the selected region were prepared with the help of local farmers and veterinarians of the district. Total sample size of 35 pig farmers *i.e.,* 5 pig breeders and 30 pig fattening farmers were selected randomly for the study. Different marketing channels for the disposal of piglets, live animals and pork were examined by selecting a sample of size of 10 traders, 5 processors, 30 retailers and 120 consumers from the study area. The collected data pertained to the 2022-23.

Marketing efficiency pertains to the outcome of marketing efforts, which can be viewed as a ratio between value of output and cost of performing marketing functions. There are two methods of computation, *viz.,* Shepherd's method and Acharya's modified measure (Manjunatha and Gracy, 2017).

Shepherd's Formula : The efficiency of the piggery supply chain was calculated with the help of the following formula (Shepherd, 1965).

$$ESC = [(V/I)-1]$$

where,

ESC = Efficiency of piggery supply chain

V = Value of goods sold

I = Total marketing cost

Higher the ratio, higher would be the efficiency and vice versa.

Acharya's Approach : According to Acharya and Agarwal (2011), an ideal measure of marketing efficiency, particularly for comparing the efficiency of alternate markets channels should consider all of the following,

a) Total marketing costs (MC)

b) Net marketing margin (MM)

c) Prices received by the farmer (FP)

d) Prices paid by the consumer (RP)

Further, the measure should reflect the following relationship between each of these variables and the marketing efficiency.

i) Higher the (a), lower the efficiency

ii) Higher the (b), lower the efficiency

iii) Higher the (c), higher the efficiency

iv) Higher the (d), lower the efficiency

As there is an exact relationship among four variables, *i.e.,* a+b+c = d, any three of these could be used to arrive at a measure for comparing the marketing efficiency.

The following measure was suggested by Acharya,

$$ME = FP \div (MC + MM)$$

Garrett's ranking technique: In this study, Garrett's ranking technique was used to rank the marketing constraints faced by farmers practicing piggery

farming in the study area. The order of the merit given by the respondents was converted into a per cent position using the formula.

Per cent position = 100 * (Rij – 0.50) / Nj

where,

Rij = Rank given for ith item by jth individual

Nj = Number of items ranked by jth individual

The per cent position of each rank was converted to scores by referring to the table given by Garrett and Woodworth (1969). Then, for each factor, the scores of individual respondents were summed up and divided by the total number of respondents for whom scores were gathered. The mean score for all the factors/constraints were ranked, following the decision criteria that the higher the value, the more important is the order of preference by respondents.

RESULTS AND DISCUSSION

Marketing of Pigs

The marketing channels for broilers in the study area involved four major intermediaries, *viz.,* integrators, traders, processors and retailers. The efficiency of marketing channels of piggery was calculated on per kilogram basis. Three marketing channels were prevalent in the study area. They were as follows:

Channel I :   Farmers - Consumer

Channel II :   Farmers - Traders - Retailers / Butchers - Consumers

Channel III : Farmers - Traders - Processors - Retailers - Consumers

TABLE 1
Marketing of pigs under different channels by sample piggery fattening farmers (n=30)

Channel	Number of farmers*	Average number of pigs sold per year
Channel I	04	85
Channel II	30	5465
Channel III	06	132

Note : Marketing Channel Followed in Piggery Fattening Farms
* Multiple responses are taken

The diverse marketing channels employed by 30 piggery fattening farmers and their corresponding sales outcomes are presented in Table 1. Four farmers (Channel I) directly sell their pigs to consumers, achieving an average of 85 pigs sold annually. Meanwhile, a substantial majority of farmers (30) engage in a Channel II marketing process, involving traders, retailers, butchers and consumers, resulting in an impressive average sale of 5465 pigs per year. Six farmers opt for another multi-stage approach

TABLE 2
Marketing cost incurred by stakeholders in piggery enterprise (per kg)

Particulars	Farmers (n=30)			Traders (n=5)	Processors (n=5)	Retailers (n=30)
	C-I Amount (Rs.)	C-II Amount (Rs.)	C-III Amount (Rs.)	Amount (Rs.)	Amount (Rs.)	Amount (Rs.)
Labour	2.30	2.30	2.30	4.20	4.10	8.20
Transportation	3.10	-	-	7.60	5.70	12.70
Commission	-	3.10	3.10	1.20	0.50	1.20
Shop rent	8.50	-	-	2.70	10.00	10.60
Processing	2.00	-	-	-	2.00	2.00
Miscellaneous	1.20	1.20	1.20	2.50	2.00	2.00
Total	17.10	6.60	6.60	18.20	24.30	36.70

(Channel III) incorporating traders, processors, retailers and consumers, achieving a moderate average sale of 132 pigs yearly. These findings spotlight varied strategies in pig sales, ranging from direct consumer interaction to intricate multi-intermediary pathways, impacting the volume of sales for these farmers. Similar results were found by Kaur *et al*., (2022).

The cost incurred per kilogram by stakeholders involved in the piggery enterprise are presented in Table 2, showcasing diverse expenditure categories. Farmers across three channels-C-I, C-II and C-III-expend amounts totalling 17.10, 6.60 and 6.60 rupees, respectively. Traders, processors and retailers incur costs amounting to 18.20, 24.30 and 36.70 rupees, respectively, per kilogram. The cost categories encompass labour, transportation, commission, shop rent, processing and miscellaneous expenses (Shivagangavva *et al,* 2018). Notably, retailers bear the highest overall cost, reflecting the diverse expenditure incurred by different stakeholders within the piggery enterprise across various expense categories per kilogram.

The price spread, the producer's share in the consumer's rupee and the marketing efficiency across three channels in the piggery fattening farms are presented in Table 3. In Channel I, the price spread remains at zero, with the producer's share in the consumer's rupee standing at 100 per cent. The marketing efficiency in this channel is notably higher at 13.77. In Channel II, the price spread is Rs.147.82, with the producer's share in the consumer's rupee decreasing to 47.26 per cent. The marketing efficiency in this channel is 4.55, reflecting increased marketing costs. Channel III displays a higher price spread of Rs.194.00/-, resulting in a decreased producer's share in the consumer's rupee at 40.58 per cent. The marketing efficiency in this channel is lower at 3.80, suggesting comparatively higher marketing costs, impacting the share of producers in the final consumer price.

The total marketing costs for both breeders and traders involved in piggery breeding farm per month for sale of average 20 piglets per month is presented

TABLE 3
Price spread in piggery fattening farms (per kg)

Particulars	Channel I	Channel II	Channel III
Producer			
Sale price	235.50	132.50	132.50
Marketing cost	17.10	6.60	6.60
Trader			
Purchase price	-	132.5	132.5
Marketing cost	-	18.20	18.20
Marketing margins	-	25.62	25.62
Processor			
Purchase price	-	-	176.32
Marketing cost	-	-	24.30
Sale price	-	-	280.36
Marketing margins	-	-	79.74
Retailer			
Purchase price	-	176.32	280.36
Marketing cost	-	36.70	36.70
Sale price	-	280.32	326.50
Marketing margins	-	67.30	9.44
Consumer			
Consumer price	235.50	280.32	326.50
Price spread	-	147.82	194.00
Producers share in consumers rupee (%)	100.00	47.26	40.58
Marketing Efficiency	13.77	4.55	3.80

in Table 4. The breeders' total cost amounts to Rs.1635.5/-, while traders' total expenses notably escalate to Rs.6830/-, primarily due to higher transportation costs incurred by the traders compared to the breeders.

TABLE 4
Marketing cost incurred by stakeholders in piggery breeders' farms

Particulars	Breeders (n=5)	Traders (n=5)
	Amount (Rs)	Amount (Rs)
Labour	665.50	1200.00
Transportation	-	4650.00
Miscellaneous	970.00	980.00
Total	1635.50	6830.00

TABLE 5

Marketing of piglets under different channels by sample Piggery Breeders in study area

Channel	Number of farmers	Total quantity/ year (No)
Channel I	1	240
Channel II	5	960

- Channel I : Breeders - Farmer
- Channel II : Breeders - Traders - Farmers

Table 5 presents the marketing distribution of piglets by piggery breeders within the study area across two distinct channels. Channel I involve one breeder, averaging 240 piglets marketed, while Channel II comprises four breeders with the total quantity of 960 piglets marketed per annum with the average 20 piglets per month. This data highlights the disparity in breeder participation and the quantity of piglets marketed across these specific channels within the study area.

The price spread, the producer's share in the consumer's rupee and the marketing efficiency within

TABLE 6

Price spread in piggery breeders' farms

Particulars	Channel I	Channel II
Producer		
Sale price	110000.00	110000.00
Marketing cost	1635.50	1635.50
Trader		
Purchase price	-	110000.00
Marketing cost	-	6830.00
Sale price	-	140000.00
Marketing margins	-	36830.00
Consumer		
Consumer price	110000.00	140000.00
Price spread	0.00	30000.00
Producers share in consumers rupee (%)	100.00	78.57
Marketing Efficiency	67.25	20.49

two channels of piggery breeder's farms are presented in Table 6. In Channel I, the price spread remains at zero, with the producer retaining 100 per cent of the consumer price, indicating no additional costs incurred from production to consumer. The marketing efficiency in Channel I stands relatively high at 67.25, reflecting efficient cost management. In contrast, Channel II displays a substantial price spread of 30000, where the producer's share decreases to 78.57 per cent of the consumer price. The marketing efficiency in Channel II is notably lower at 20.49, implying higher costs incurred during marketing activities, impacting the share of producers in the final consumer price.

The Diverse marketing constraints encountered by pig farmers are presented in Table 7, each associated with a mean Garrett's score and corresponding rank. The top constraint, Lack of organized marketing ranked first, points to the absence of structured marketing systems, hampering effective promotion and sales strategies. Following this, Lack of marketing area nearby (Talukdar *et al.*, 2018), ranked second with a score of 59.00, highlights the challenge farmers face in accessing nearby markets for efficient sales. Exploitation by middlemen, ranking third at 51.00, indicates the detrimental impact of unfair trade practices affecting farmer's profits. Lack of consumers in the area at a score of 33.60 and ranked fourth, signifies the limited demand within the vicinity, affecting sales. Finally, social taboo, ranking fifth with a score of 25.00, highlights cultural stigmas impacting market acceptance and demand for pig-related products within certain communities.

TABLE 7

Marketing constraints of pig farmers

Marketing Constraints	Mean Garrett's score	Rank
Lack of organized marketing	74.00	I
Lack of consumers in area	33.60	IV
Exploitation by middleman	51.00	III
Lack of marketing area nearby	59.00	II
Social taboo	25.00	V

These constraints collectively showcase the multifaceted challenges influencing pig farmer's marketing endeavours, from infrastructure and accessibility issues to societal and cultural perceptions affecting market dynamics.

A comprehensive view of the challenges encountered by pig traders in their marketing endeavours, highlighting various constraints and their respective impact based on Garrett's mean score and rank are given in Table 8. Non-Availability of pigs for sale, ranking first with a substantial score of 72.00, indicating a severe impediment in consistent pig availability for trade. Following closely is the non-availability of timely market information and linkage, securing the second position with a score of 55.00, pointing to the difficulty traders face in accessing timely market data and establishing crucial market connections for informed decision-making. High price fluctuation, ranked third at 45.00, denotes the challenge posed by unpredictable price variations impacting trader's ability to manage profitability. Lastly, Insufficient logistic infrastructure, ranking fourth at 29.00, signifies the inadequacies in logistical support affecting trader's operational efficiency in transportation and distribution. These constraints collectively illustrate the complexities and hurdles faced by pig traders, encompassing pig availability, market information, price stability and logistical challenges, influencing their trade operations and profitability.

The critical marketing constraints encountered by pig retailers are presented in Table 9, presenting various challenges along with their Garrett's mean score and

TABLE 8
Marketing constraints of pig traders

Traders constraints	Garrett's mean score	Rank
Non-Availability of pigs for sale	72	I
High price fluctuation	45	III
Lack of timely market information and linkage	55	II
Lack of proper logistics	29	IV

TABLE 9
Marketing constraints of pig retailers

Retailers constraints	Garrett's mean score	Rank
High price fluctuation	79.20	I
Lack of timely market information and Linkage	45.30	III
Social taboos affecting the sales	60.40	II
Labour availability	30.30	IV

corresponding rank. High price fluctuation, ranking first with a substantial score of 79.20, signifies the significant hurdle posed by erratic market pricing, impacting retailer's pricing strategies and profitability. Social taboos affecting sales secure the second position at 60.40, highlighting the impact of cultural stigmas on consumer behaviour and market acceptance of pig-related products. Lack of timely market information and linkage follows as the third constraint with a score of 45.30, underscoring the difficulties retailers face in obtaining timely market data and establishing vital market connections for informed decision-making. Labour availability, ranking fourth at 30.30, points to challenges in securing sufficient manpower, hampering retailer's operational efficiency. These constraints collectively outline the multifaceted challenges experienced by pig retailers, encompassing pricing volatility, societal perceptions, market information access and labour availability, significantly influencing their marketing strategies and operational effectiveness. The study reveals the intricate nature of the pig farming and marketing realms practiced in study area. The data illustrates diverse marketing approaches adopted by piggery farmers, influencing sales volumes, costs and the proportion of the final consumer price retained by producers.

Furthermore, insights into specific costs incurred by stakeholders within the piggery enterprise, encompassing labour, transportation, processing and miscellaneous expenses, shed light on the economic dynamics along the supply chain.

The delineation of constraints faced by pig farmers, traders and retailers underscores the multifaceted challenges impacting different stages of the supply chain. These challenges include issues such as disorganized marketing, limited availability of pigs for sale, price fluctuations and societal taboos, affecting production, trade activities and sales strategies.

The collective representation emphasizes the complexity of marketing channels, cost dynamics and constraints within the pig farming industry. It emphasizes the need for streamlined strategies, enhanced market access and improved efficiency across the marketing channel to overcome challenges and enhance profitability in the sector.

The study assesses the market structure and efficiency of the piggery industry in study area, focusing on various stakeholders and marketing channels. It examines the sales strategies, costs incurred, price spreads and constraints faced by pig farmers, traders, and retailers. Three main marketing channels were identified, each involving different intermediaries, affecting sales volumes and costs. The study highlights the challenges such as lack of organized marketing, pig availability, price fluctuations and societal taboos affecting the industry. Insights into costs, sales volumes and constraints provide valuable understanding for stakeholders. The findings underscore the need for streamlined strategies, improved market access and enhanced efficiency to overcome challenges and boost profitability in the piggery sector.

To enhance market access for pig farmers, it is imperative to enhance marketing infrastructure and systems, tackling issues like the lack of organized marketing. Overcoming the major constraint of an unorganized market is essential and should be the priority in strengthening the piggery farming sector. Encouraging collaboration and networking among pig farmers, traders, processors, retailers and other stakeholders in the value chain is recommended.

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