ECONOMIC EVALUATION OF BACKYARD POULTRY ENTERPRISE - A STUDY IN SOUTH BENGALURU

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BANGALORE

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ECONOMIC EVALUATION OF BACKYARD POULTRY ENTERPRISE - A STUDY IN SOUTH BENGALURU

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By

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BANGALORE

CERTIFICATE

This is to certify that the thesis entitled "**ECONOMIC EVALUATION OF BACKYARD POULTRY ENTERPRISE - A STUDY IN SOUTH BENGALURU**" submitted in partial fulfilment of the requirements for the degree of **Master of Science (Agriculture) in Agricultural Marketing and Co-operation** to the University of Agricultural Sciences Bangalore is a record of bona fide research work carried out by **Ms. POOJA HANDIGUND, PAMB 0162**, during the period of her study in this University under my guidance and supervision. The thesis has not previously formed the basis for the award of any degree, diploma, associateship, fellowship or other similar titles.

Bengaluru
December, 2022

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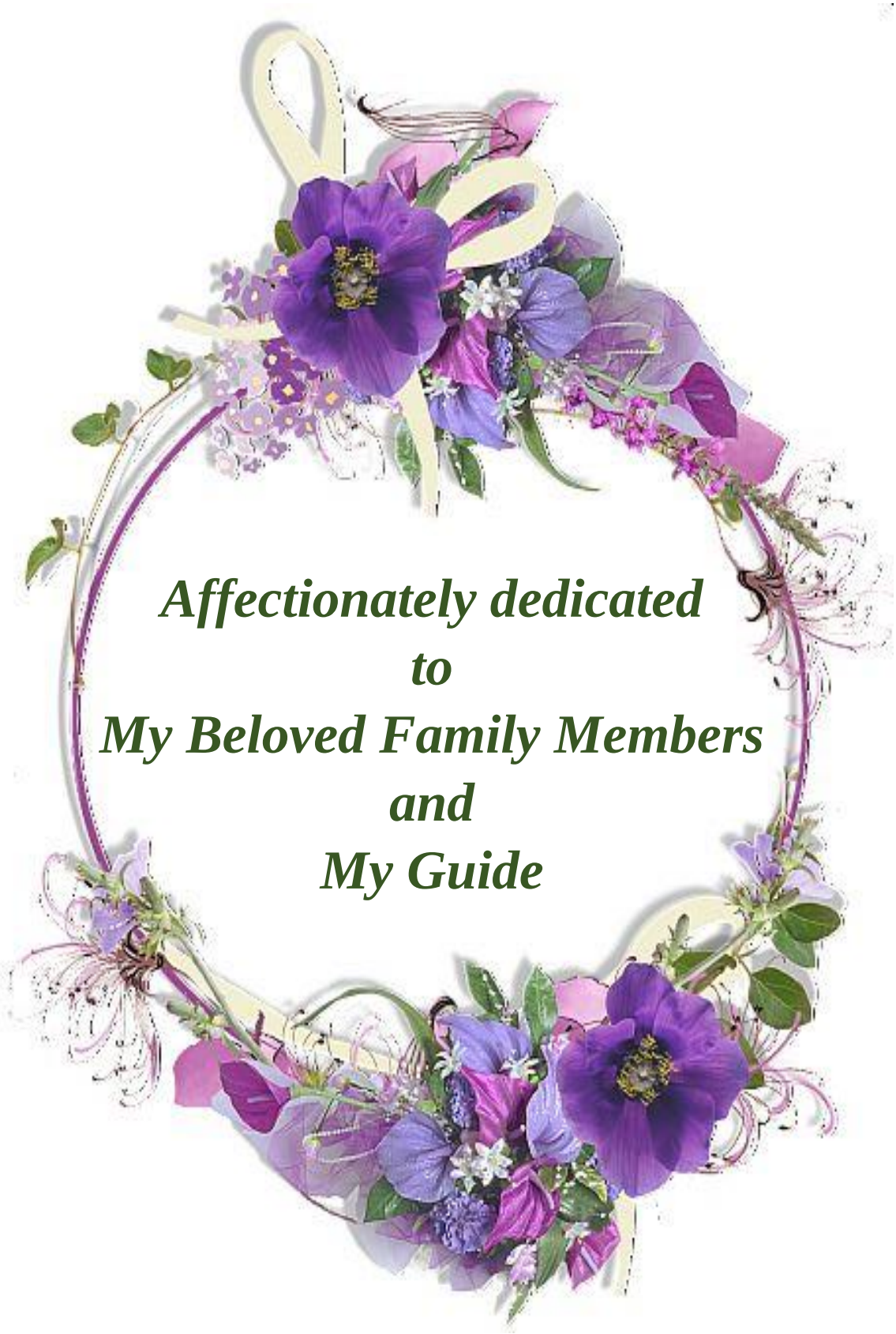

Affectionately dedicated
to
My Beloved Family Members
and
My Guide

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Women Participation in Backyard Poultry Rearing in South Bengaluru

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Introduction

Livestock rearing is one of the most important economic activities in rural areas contributing significantly to the national economy. Poultry is an important sub-sector of livestock in India.

Poultry sector in India is mainly divided into two sub-sectors, i.e., one with a highly organized commercial sector and the other being backyard poultry. Backyard poultry is an old age profession of rural families of India with high potential of subsidiary income for landless and poor farmers. It is an enterprise with low investment but higher economic returns and can be easily managed by women. It helps to improve the skills of most of the poor women in boosting their socio-economic and nutritional status.

As per the 20th Livestock Census 2019, there has been a growth of 45.78 per cent in the backyard poultry population from 2012 to 2019 and the total population of backyard poultry stood at 317.07 million in 2019. Karnataka has about 10.98 million fowl in backyard poultry comprising of 2.56 million cocks, 4.27 million hens, and 4.14 million chicken below five months age.

Objective

1. To assess the women participation in backyard poultry rearing

Methodology

The study was conducted in South Transect of Bengaluru. Bengaluru South taluk of Bengaluru Urban district and Ramanagara taluk of Ramanagara district was purposively selected for the study

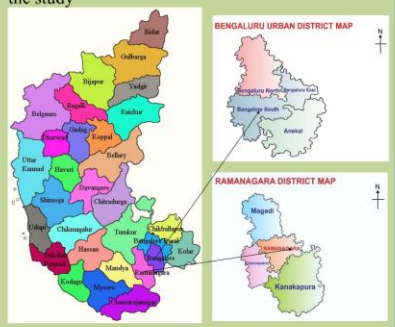

Fig. 1: Map of the study area

Sample: Purposive sampling method was followed to draw the sample. The primary data was collected from 40 backyard poultry farmers.

Data Analysis: The data collected through personal interview method using pre-tested well-structured schedule, was analyzed using descriptive statistics.

Results and Discussion

Table 1: Participation of women in backyard poultry rearing in South Bengaluru

(n= 40)

Sl. No.	Activity	Men (per cent)	Women (per cent)
1.	**Selection of chicken**		
	a. Selection of breed	40.00	60.00
	b. Purchase of chicks	72.50	27.50
2.	**Management**		
	a. Supervision of chicks	12.50	87.50
	b. Feeding	10.00	90.00
	c. Watering	10.00	90.00
	d. Maintenance of temperature	17.50	82.50
	e. Bamboo basket cooping	42.50	57.50
	f. Collection of eggs	25.00	75.00
3.	**Medical care**		
	a. Vaccination	75.00	25.00
	b. Disease control measures	37.50	62.50
4.	**Marketing**		
	a. Sale of eggs	25.00	75.00
	b. Sale of birds	50.00	50.00
5.	**Record keeping**		
	a. Number of eggs sold	35.00	65.00
	b. Number of birds sold	27.50	72.50
	c. Mortality of chicks	22.50	77.50

Note: The average backyard poultry flock size is 28 birds

Participation of women in backyard poultry rearing is presented in Table 1. The average flock size was found to be 28 birds. Majority of respondents (62.50 %) were women, whereas (37.50 %) men were involved in backyard poultry rearing. These findings are similar to the study conducted by Bharti *et al*., (2019) on the benefits and constraints in backyard poultry farming as perceived by rural women in Bundelkhand region of Uttar Pradesh.

The results of the study indicated that women were significantly involved in selection of breeds (60.00 %), management aspects such as supervision of chicks (87.50 %), feeding (90.00 %), watering (90.00 %), maintenance of temperature (82.50 %), collection of eggs (75.00 %), and bamboo basket cooping (57.50 %). Further, it was found that women were also involved in sale of eggs (75.00 %) and record keeping activities such as number of eggs sold (65.00 %), number of birds sold (72.50 %), and mortality of chicks (77.50 %) in comparison to men. This enterprise provide regular income to women using little inputs and the production can be easily managed by women in the household.

Participation of men in backyard poultry rearing was found to be more in activities such as vaccination (75.00 %) and purchase of chicks (72.50 %). Both men and women were equally involved in sale of birds.

Graphs and Photographs

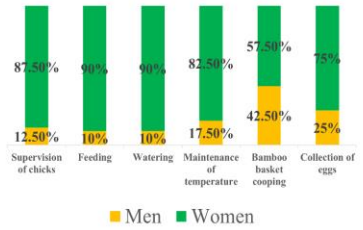

Fig. 2: Participation of men and women in backyard poultry rearing

Plate 1: Researcher collecting data from backyard poultry reares in Avaragere village, Ramanagaram district

Summary

The results of the study indicated that backyard poultry rearing is predominantly done by women. Women had significantly higher knowledge in selection of breeds and management aspects although the medical care of poultry birds were looked after by men.

Government intervention via training programs and adequate credit facility to women can substantially strengthen the backyard poultry enterprise in rural areas empowering women to earn higher income.

References

BHARTI, R., SAGAR, M.P., DEEPA, S. AND MAINA, K., 2019, Benefits and Constraints as perceived by Rural Women in Backyard Poultry Farming in Bundelkhand region of Uttar Pradesh. *The Pharma Innovation Journal*, **8** (4): 189-191.

Advisory Committee

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ECONOMIC EVALUATION OF BACKYARD POULTRY ENTERPRISE - A STUDY IN SOUTH BENGALURU

POOJA HANDIGUND

ABSTRACT

The present study was conducted in South Bengaluru including Bengaluru Urban and Ramanagara districts. The study aimed at estimating the profitability of backyard poultry enterprise; analyzing the marketing of backyard poultry birds and eggs; assessing the women participation in backyard poultry rearing; analyzing the consumer preference for backyard poultry birds and eggs; examining the constraints in production and marketing of backyard poultry birds and eggs. The primary data was collected from 40 backyard poultry rearers, 90 consumers, five butchers and five traders. The total cost incurred per annum for rearing a flock size of 28 birds was found to be Rs. 8,711.02/- and the annual gross returns obtained from sale of hen, cock, eggs and manure was Rs. 21,000/- resulting in net returns of Rs. 12,288.98/- demonstrating the financial viability of backyard poultry rearing. Three marketing channels of birds were prevalent in the study area *viz.*, Channel I: Farmer – Consumer; Channel II: Farmer – Trader – Consumer; and Channel III: Farmer – Trader – Butcher – Consumer. Majority of the respondents exclusively retained the birds for household consumption. Women (62.50 %) were significantly involved in rearing when compared to men. Nutritional value and taste were the major factors influencing the consumption of backyard poultry birds and eggs. Incidence of diseases was the major production constraint and price fluctuation was the major marketing constraint. The study suggested for community-based approaches like Self Help Groups (SHGs) and Farmer Producer Organizations (FPOs) to earn higher economic returns from production and marketing of backyard poultry birds and eggs.

December, 2022
Institute of Agribusiness Management,
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(Mamatha Girish)
Major Advisor

ದಕ್ಷಿಣ ಬೆಂಗಳೂರಿನಲ್ಲಿ ಹಿತ್ತಲಿನ ಕೋಳಿ ಉದ್ಯಮದ ಆರ್ಥಿಕ ಮೌಲ್ಯಮಾಪನದ ಅಧ್ಯಯನ

ಪೂಜಾ ಹಂದಿಗುಂದ

ಸಾರಾಂಶ

ಪ್ರಸ್ತುತ ಅಧ್ಯಯನವನ್ನು ದಕ್ಷಿಣ ಬೆಂಗಳೂರಿನ ಬೆಂಗಳೂರು ನಗರ ಮತ್ತು ರಾಮನಗರ ಜಿಲ್ಲೆಯ ರಾಮನಗರ ತಾಲೂಕಿನಲ್ಲಿ ನಡೆಸಲಾಗಿದೆ. ಹಿತ್ತಲಿನ ಕೋಳಿ ಮತ್ತು ಮೊಟ್ಟೆಗಳ ಲಾಭದಾಯಕತೆ ಮತ್ತು ಮಾರಾಟ; ಹಿತ್ತಲಿನ ಕೋಳಿ ಸಾಕಣೆಯಲ್ಲಿ ಮಹಿಳೆಯರ ಭಾಗವಹಿಸುವಿಕೆ; ಹಿತ್ತಲಿನ ಕೋಳಿ ಮತ್ತು ಮೊಟ್ಟೆಗಳಿಗೆ ಗ್ರಾಹಕರ ಆದ್ಯತೆ; ಉತ್ಪಾದನೆ ಹಾಗೂ ಮಾರಾಟದಲ್ಲಿನ ನಿರ್ಬಂಧಗಳನ್ನು ವಿಶ್ಲೇಷಿಸಲಾಯಿತು. ಪ್ರಾಥಮಿಕ ದತ್ತಾಂಶವನ್ನು 40 ಹಿತ್ತಲಿನ ಕೋಳಿ ಸಾಕಣೆದಾರರು, 90 ಗ್ರಾಹಕರು, ಐದು ಕಟುಕರು ಮತ್ತು ಐದು ವ್ಯಾಪಾರಿಗಳಿಂದ ಸಂಗ್ರಹಿಸಲಾಗಿದೆ. ಅಧ್ಯಯನ ಪ್ರದೇಶದಲ್ಲಿ ಸರಾಸರಿ ಪಕ್ಷಿಗಳ ಹಿಂಡು 28 ಆಗಿದ್ದು ಅವುಗಳ ಸಾಕಣೆಗೆ ವಾರ್ಷಿಕವಾಗಿ ಒಟ್ಟು ವೆಚ್ಚ ರೂ. 8,711.02/- ತಗಲುತ್ತದೆ. ಕೋಳಿ, ಕೋಳಿ ಮೊಟ್ಟೆ ಮತ್ತು ಗೊಬ್ಬರ ಮಾರಾಟದಿಂದ ಪಡೆದ ವಾರ್ಷಿಕ ಒಟ್ಟು ಆದಾಯ ಮತ್ತು ನಿವ್ವಳ ಆದಾಯವು ಅನುಕ್ರಮವಾಗಿ ರೂ. 21,000/- ಮತ್ತು ರೂ. 12,288.98/- ಗಳಾಗಿದ್ದು ಹಿತ್ತಲಿನ ಕೋಳಿ ಸಾಕಾಣಿಕೆಯ ಆರ್ಥಿಕ ಕಾರ್ಯಸಾಧ್ಯತೆಯನ್ನು ಪ್ರದರ್ಶಿಸುತ್ತದೆ. ಅಧ್ಯಯನದ ಪ್ರದೇಶದಲ್ಲಿ ಕೋಳಿ ಮಾರಾಟಕ್ಕೆ ಮೂರು ಮಾರಾಟ ಸರಪಳಿಗಳನ್ನು ಗುರುತಿಸಲಾಗಿದೆ, ಸರಪಳಿ I: ರೈತ – ಗ್ರಾಹಕ; ಸರಪಳಿ II: ರೈತ – ವ್ಯಾಪಾರಿ – ಗ್ರಾಹಕ; ಮತ್ತು ಸರಪಳಿ III: ರೈತ – ವ್ಯಾಪಾರಿ – ಕಟುಕ – ಗ್ರಾಹಕ. ಕೋಳಿ ಸಾಕಣೆದಾರರಲ್ಲಿ ಹೆಚ್ಚಿನವರು ಮನೆಯ ಬಳಕೆಗೆ ಪ್ರತ್ಯೇಕವಾಗಿ ಪಕ್ಷಿಗಳನ್ನು ಉಳಿಸಿಕೊಂಡಿರುತ್ತಾರೆ. ಪುರುಷರಿಗೆ ಹೋಲಿಸಿದರೆ ಮಹಿಳೆಯರು (62.50 %) ಕೋಳಿ ಪಾಲನೆಯಲ್ಲಿ ಹೆಚ್ಚಾಗಿ ತೊಡಗಿಸಿಕೊಂಡಿರುತ್ತಾರೆ. ಪೌಷ್ಟಿಕಾಂಶದ ಮೌಲ್ಯ ಮತ್ತು ರುಚಿ ಹಿತ್ತಲಿನ ಕೋಳಿ ಮತ್ತು ಮೊಟ್ಟೆಗಳ ಸೇವನೆಯ ಮೇಲೆ ಪ್ರಭಾವ ಬೀರುವ ಪ್ರಮುಖ ಅಂಶಗಳಾಗಿವೆ. ರೋಗಗಳ ಸಂಭವವು ಪ್ರಮುಖ ಉತ್ಪಾದನಾ ನಿರ್ಬಂಧವಾಗಿದ್ದು ಬೆಲೆ ಏರಿಳಿತವು ಪ್ರಮುಖ ಮಾರಾಟ ನಿರ್ಬಂಧವಾಗಿದೆ. ಹಿತ್ತಲಿನ ಕೋಳಿ ಮತ್ತು ಮೊಟ್ಟೆಗಳ ಉತ್ಪಾದನೆ ಮತ್ತು ಮಾರಾಟದಿಂದ ಹೆಚ್ಚಿನ ಆರ್ಥಿಕ ಆದಾಯವನ್ನು ಗಳಿಸಲು ಸ್ವಯಂ ಸಹಾಯ ಗುಂಪುಗಳು (SHGs) ಮತ್ತು ರೈತ ಉತ್ಪಾದಕ ಸಂಸ್ಥೆಗಳು (FPOs) ನಂತಹ ಸಮುದಾಯ ಆಧಾರಿತ ವಿಧಾನಗಳಿಗೆ ಅಧ್ಯಯನವು ಸಲಹೆ ನೀಡಿದೆ.

ಡಿಸೆಂಬರ್, 2022 (ಮಮತಾ ಗಿರೀಶ್)

ಕೃಷಿ ವ್ಯವಹಾರ ನಿರ್ವಹಣೆ ಸಂಸ್ಥೆ, ಪ್ರಮುಖ ಸಲಹೆಗಾರರು

ಕೃ.ವಿ.ವಿ., ಬೆಂಗಳೂರು - 560 065

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SYMBOL	ABBREVIATION
@	at the rate
%	Per cent
et al.	Co workers
etc.	Etcetera (so on)
fig.	Figure
viz.	Namely
i.e.,	That is
GVA	Gross Value Added
CAGR	Compound Annual Growth Rate
NAS	National Account Statistics
NDDB	National Dairy Development Board
OECD	Organisation for Economic Co-operation and Development
CPDO & TI	Central Poultry Development Organization and Training Institute
ICAR	The Indian Council of Agricultural Research
GDP	Gross Domestic Product
BPL	Below Poverty Line
FAO	Food and Agriculture Organization
BAHS	Basic Animal Husbandry Statistics
KCPF	Karnataka Co-operative Poultry Federation
GDP	Gross Domestic Product
BPL	Below Poverty Line

INTRODUCTION

I INTRODUCTION

Agriculture sector is the backbone of the Indian economy. About 61 per cent of the population in the country rely on agriculture and related activities for their main source of income. About 58 per cent of the population is employed by it, and it accounts for about 18 per cent of India's total Gross Domestic Product (GDP). India's agricultural sector has expanded quickly during the past few decades.

However, the agriculture sector's contribution to total Gross Value Added (GVA) is 20.2 per cent, the services sector accounts for 53.89 per cent and the industry sector makes up 25.92 per cent of the GVA in 2020–2021 (*www.indiabudget.gov.in*). In the fiscal year 2020, agriculture, forestry, and fishery contributed a GVA of about Rs. 19.48 lakh crores (US $ 276.37 billion) and 17.8 per cent of India's GVA was made up of the agricultural and related sectors (*www.ibef.org*).

The Indian agro-industry is divided into a number of sub-sectors, ranging from fisheries, meat, poultry, dairy, processed, and frozen food. The Ministry of Agriculture and Farmers' Welfare is in charge of developing India's agricultural industry. It oversees a number of other organisations, like the National Dairy Development Board (NDDB), to foster the growth of other related agricultural industries.

1.1 Role of livestock in agriculture

The livestock has emerged as one of the fastest-growing sectors and it undoubtedly aid in the fight against poverty in a developing nation like India, where the majority of rural poor people depend on livestock for their daily subsistence. As per the 20th Livestock Census 2019, the total livestock population was 536.76 million comprising of cattle (36.00 %), goats (27.70 %), buffaloes (20.50 %), sheep (13.80 %), and pigs (1.70 %). Yaks, mithun, mules, horses, ponies, donkeys, and camels taken together contribute 0.30 per cent of the total livestock population and about nine per cent of the workforce in the nation is employed in the livestock sector. Additionally, it has been noted that developing nations are seeing a substantial increase in the demand for animal protein sources in the form of milk, meat and egg.

The livestock industry in India expanded at a Compound Annual Growth Rate (CAGR) of 8.24 per cent from 2014–15 to 2018–19. The estimated GVA contribution of cattle to the entire agricultural and allied industry at constant prices has increased from 24.32

per cent in 2014–15 to 28.63 per cent in 2018-19 as per the estimates of National Accounts Statistics (NAS) 2020. In 2018–19, the cattle industry made up 4.19 per cent of the total GVA. In 2017-18 livestock sector contributed 4.11 per cent to GDP and 25.6 per cent to total agriculture GDP (*www.vikaspedia.in*).

1.2 Backyard poultry farming in India

Poultry is an important sub-sector of livestock in India and has played a crucial role in both creating jobs and significantly boosting the country's Gross Domestic Product (GDP). Poultry development has taken a quantum leap in last three decades due to the progression of processing technology, increases in urbanisation and affluence, and advancements in the market supply chain.

According to the Organisation for Economic Co-operation and Development - Food and Agriculture Organization (OECD-FAO) Agricultural Outlook (2008-2017), the increase in demand for chicken products in India would be 4.8 per cent, while the supply will expand at 5.2 per cent annually over the course of the decade, outpacing all other types of animal products. While the output of agricultural crops has been rising at a pace of 1.5–2 per cent annually, the production of eggs and broilers has been found to be increasing at a rate of 8–10 per cent annually.

In India, there are primarily two sub-sectors of the poultry industry: one has a highly structured commercial sector that accounts for about 80 per cent of the entire market share, and the other has an unorganised sector that accounts for about 20 per cent of the total market share. Backyard poultry, a part of the unorganised sector that contributes significantly for improving the socio-economic and dietary circumstances of the poor. Approximately 30 million farmers raise backyard chickens according to the 19th Livestock Census. About 18 per cent (18.41 billion) of India's total egg production (103.32 billion) comes from backyard poultry reported by Basic Animal Husbandry Statistics (Anonymous, 2019).

In backyard poultry farming, small numbers of native chickens are reared with or without inputs under the free-range scavenging conditions, natural hatching, low bird output, regional marketing, and lack of medical care. In recent years, backyard poultry has gained recognition as a powerful strategy for reducing poverty, though the practise of raising chickens in backyards has been followed in villages for ages. However, the modern scientific

backyard poultry farming had begun recently with the start of research into the development of high-performing chickens that are appropriate for backyard poultry farming.

Backyard fowls provide a high-quality food source with vital macro and micronutrients as well as vitamins in the form of meat and eggs and they are always valued for their flavor and texture in both rural and organised developed markets, even though the majority of poultry products are made from commercially raised improved breeds.

The University of Agricultural Sciences, Bangalore was a pioneer in creating a high performing bird that would thrive in rural backyards. A paradigm change in the nation's poultry breeding activities toward rural poultry has been brought about by the development of the Giriraja bird.

The development of dual-purpose chicken variety Vanaraja by the ICAR Directorate of Poultry Research, Hyderabad, revolutionised the backyard poultry in India as the birds were welcomed by farmers throughout the nation in various agro-climatic regions. Gramapriya, a brown egg layer variety, was subsequently created at ICAR Directorate of Poultry Research, Hyderabad. Due to popularity of various breeds suitable for backyard farming, numerous enhanced varieties have been created by various agricultural/veterinary universities and ICAR organisations.

1.3 History of backyard poultry farming

Evidence of the domestication of chickens dates back to the ancient Neolithic Period of China in 6000 BC to Indus Valley Civilization in 2500 BC. Over the years, the Red jungle fowl were domesticated by humans in the Indus valley and they mainly used for cock fighting which lasted for almost 500 years until the Indus valley was overrun by Aryans in 1500 BC. The Aryans discovered these birds and decided to employ them in their ceremonial rituals and culture. After that, birds were moved to other places like Greece, North Africa, Romans in Southern Italy, Persia and Mesopotamia.

The first place where chickens were regularly used as a food source was Greece. The Romans were the second group to use chickens as food. The Romans realized that chickens were a good source of protein, even though, they were still utilised for ceremonies and as sport entertainment. The Red jungle fowl is regarded to be the ancestor of the domesticated chicken over the years and these birds are native to North India and are still raised there, specifically in the states of West Bengal, Odisha, Madhya Pradesh and the Godavari area of

Andhra Pradesh, which stretch from Kashmir to Assam. Human beings and poultry have shared history for thousands of years, and the history will continue in the future.

1.4 Backyard poultry in India

As per the 20th Livestock Census, the total poultry population has increased from 729.21 million in 2012 to 851.81 million in 2019 by the rate of 16.81 per cent and the total population of backyard poultry has increased from 217.49 million to 317.07 million by the rate 45.79 per cent and the total population of commercial poultry increased by 511.72 million to 534.74 million by the rate of 4.50 per cent. More than 50 per cent of India's backyard poultry population are found in five states; West Bengal, Assam, Andhra Pradesh, Maharashtra and Tamil Nadu. Karnataka has 3.90 per cent backyard population in India.

1.5 Backyard poultry in Karnataka

As per the 20th Livestock Census, Karnataka has about 30.34 million livestock population. The total poultry population was 61.81 million and total population of backyard poultry was 10.98 million comprising of 2.56 million cocks, 4.27 million hens and 4.14 million chickens below five months. The share of top ten different districts of backyard poultry birds in Karnataka is presented in Table 1.

1.6 Institutions of Backyard poultry farming in Karnataka

The Central Poultry Development Organization and Training Institute (CPDO & TI) located at Hesaraghatta in Karnataka, was established in 1972 to cater to the training needs of the country and of other developing countries in poultry production and allied activities.

CPDO & TI is a division of the Ministry of Agriculture and Farmers Welfare, Department of Animal Husbandry, Dairying and Fisheries, Government of India maintains the germplasm of birds with low input requirements, multiplies and develops these stocks, and supply them to rural poultry development programmes. The development of poultry in southern states is met by CPDO & TI.

The Karnataka Co-operative Poultry Federation Ltd (KCPF) established on 15th March, 1995 was registered under Karnataka Co-operative Societies Act 1959. KCPF Bengaluru, a federation of 100 primary poultry co-operative societies, is also involved in promoting, producing, and selling Giriraja chicks to assist backyard poultry.

Table 1: Backyard poultry population in different districts of Karnataka state

Sl. No.	Districts	Rural	Urban	Total
1.	Kalaburagi	8,29,458	79,953	9,09,411
2.	Dakshina Kannada	6,76,450	1,01,119	7,77,569
3.	Tumakuru	6,91,191	19,349	7,10,540
4.	Belagavi	5,95,021	44,079	6,39,100
5.	Udupi	5,64,015	25,757	5,89,772
6.	Mandya	5,24,109	21,680	5,45,789
7.	Hassan	5,05,066	14,643	5,19,709
8.	Mysuru	4,56,639	24,751	4,81,390
9.	Kolar	3,96,153	28,253	4,24,406
10.	Uttar Kannada	3,34,663	27,845	3,62,508
	Total (Karnataka)	**1,02,19,059**	**8,44,706**	**1,10,63,765**

Source: Anonymous, 2007

One KCPF Regional Center in Dharwad is raising and nurturing backyard chicken chicks of the Swarnadhara, Giriraja, and Chabro breeds to encourage backyard poultry farming in Karnataka. The price of goods and the distribution of chicks to farmers for rearing are determined by the Department of Animal Husbandry. Chicks are also raised at a KCPF Regional Center in Kalaburagi, where they are raised for six weeks before being given to farmers at a price set by the Department of Animal Husbandry and Veterinary Services.

Rural Backyard Poultry Development programme was launched in 2009–10, a centrally sponsored scheme for the development of backyard poultry in rural areas and this programme is supported by the government for developing the poultry industry.

Below Poverty Line (BPL) residents are the only beneficiaries of this programme. This is one of the efforts the government has implemented to primarily help people acquire supplemental income and nutritional support for subsistence. An estimated 40 crore was approved in 2013–14, covering aid for almost 1.66 lakh BPL recipients. Since the initiative's, about 6.13 lakh BPL beneficiaries have received financing as part of the programme.

The poultry development under Department of Animal Husbandry and Veterinary Services (DAH&VS) includes the following activities:

i. Giriraja parent stock of birds is bred and raised using a scientific breeding system under a franchise agreement with the Karnataka Veterinary Animal and Fisheries Sciences University (KVA&FSU), Veterinary College Bengaluru.

ii. Day-old "Giriraja" chicks are produced and supplied to farmers and departmental rearing centres.

iii. The raising and distribution of four to six week-old "Giriraja birds" to recipients of various socio-economic programmes.

iv. Providing instruction in current poultry farming practices for both layers and broilers, as well as project report writing.

1.7 Need for the study

Due to the growth of the poultry industry in Bengaluru, changing food preferences, urbanisation, increased knowledge of health care needs, rising per capita income, and increased demand for poultry products, poultry farming has taken on a unique relevance. According to the 2011 Census of Population, India is a predominantly rural nation with 833 million residents living in rural areas. Indian rural families' practice old-age occupation of raising chickens in their backyards. For poor and landless farmers, it is the most effective source of secondary income. It is a business that can easily be run by women and has a minimal initial investment but substantial economic rewards. For rural India's per capita requirements of protein and energy, poultry meat and eggs are now the best and most affordable options. The backyard poultry rearing is gaining importance day by day in Karnataka and many research efforts are taken to develop the new breeds suitable for backyard. But much studies hadn't taken place in south Bengaluru, especially in Bengaluru south taluk of Bengaluru urban district and Ramanagara taluk of Ramanagara district. Because urban and semi-urban areas are the primary production hubs for commercial poultry meat and eggs. Since they do not typically operate in rural areas as they are more conducive to industrial activity. It is worth mentioning is that tiny rural backyard producers in South Bengaluru serve the demands of customers who want coloured bird and brown-shelled eggs, both of which are primarily raised in rural areas, while also provides a secondary source of income through the raising of coloured bird with the average units of 20 to 28 birds per family in their backyards.

The present study is an attempt to analyze the economic evaluation of backyard poultry enterprise in South Bengaluru.

1.8 Objectives of the study

1. To estimate the profitability of backyard poultry enterprise
2. To analyze the marketing of backyard poultry birds and eggs
3. To assess the women participation in backyard poultry rearing
4. To analyze the consumer preference for backyard poultry birds and eggs
5. To examine the constraints in production and marketing of backyard poultry birds and eggs

1.9 Hypotheses of the study

1. Backyard poultry is financially viable.
2. Backyard poultry birds and eggs are sold in villages itself.
3. Women have greater participation than men in backyard poultry rearing.
4. Consumers prefer meat and eggs of backyard poultry compared to broiler.
5. Incidence of diseases is the major production constraint and price fluctuation is the major marketing constraint in backyard poultry rearing.

1.10 Presentation of the study

The thesis is organised into five chapters. The first chapter presents the particular objectives of the study along with a brief introduction. In the second chapter, relevant reviews are offered in accordance with the research objectives. The third chapter covers the salient characteristics of the research area, the sampling strategy, the database, and the analytical tools for data analysis. In the fourth chapter, empirical findings and discussion are presented. The fifth chapter summarises the main results and explores the implications of the study. Finally, a list of cited periodicals, thesis, and websites is included in the sixth chapter.

REVIEW OF LITERATURE

II REVIEW OF LITERATURE

A review of the research work done earlier pertaining to the present study has been presented in this chapter under the following sub-headings.

2.1 Profitability of backyard poultry enterprise

2.2 Marketing of backyard poultry birds and eggs

2.3 Women participation in backyard poultry rearing

2.4 Consumer preference for backyard poultry birds and eggs

2.5 Constraints in production and marketing of backyard poultry birds and eggs

2.1 Profitability of backyard poultry enterprise

Amos (2006) examined the analysis of backyard poultry production in Ondo State, Nigeria. The study found that total production cost per backyard poultry layer was naira. 4046.78 while the total revenue per layer was naira 4481.29. The analysis also revealed that layer farmers earned an average of naira 434.51 as net profit per layer. For backyard poultry broiler production, the total production cost per bird was naira 653.68 while the total revenue per broiler was naira. 747.39 and the profit per broiler was naira 94.7. Hence, the profit per broiler for the four production cycle spread within one production of layer cycle was naira 374.8 which revealed that layers production business was more profitable than broiler production business.

Sumy *et al*., (2010) assessed the study on the socio-economic condition and productive performance of backyard chicken in some selected areas of Pabna district in Bangladesh. The study found that familywise and per bird total income was taka 2124.00 and taka 223.95, respectively which was higher than the net cost of taka 1324.23 and taka 138.70, respectively. The B:C ratio in family wise and per bird wise was 1.60 and 1.61 respectively which indicated that if backyard chicken rearers invest taka 1.0 then they can earn taka 1.60. So, familywise profit was taka 0.60 and per bird basis was taka 0.61.

Daida *et al*., (2012) examined the livelihood security of rural women through Rajasri backyard poultry farming in Nalgonda district of Andhra Pradesh. The study found that the women gained an annual income of Rs. 5,02,984 through the disposal of eggs, chicks and

culled birds. An amount of Rs. 279.43 was realized from each bird excluding chick cost. It was found that the rural poultry rearers could generate Rs. 28.51 as net income per day by maintaining 30 Rajasri birds.

Tufail *et al*., (2012) analysed the economics of backyard poultry farming in Tehsil Matta district of Pakistan. The study found that gross revenue generated per bird was Rs. 227.89, from which Rs. 219.23 was earned from eggs which was about 96.2 per cent of the gross income. While Rs. 8.62 was obtained from the sale of birds which contributed 3.8 per cent of the gross income. The annual total cost per bird was Rs. 79.23 and the annual net revenue per bird was Rs. 148.66.

Islam *et al*., (2015) analysed the benefit-cost ratio of Vanaraja and local chicken of under backyard system of rearing in Assam. The total cost of production up to 72 weeks of age was found to be higher in Vanaraja (Rs. 2,577.68) than in local counterpart (Rs. 2,150.98). The maximum amount of income was contributed by sale of eggs (40.00 %) followed by sale of cocks (34.36 %) and sale of spent hens (25.64 %) in the case of local chicken. The B:C ratio in Vanaraja and local chicken were recorded as 2.60 and 2.27 respectively.

Dhaka *et al., (*2017) examined contribution of backyard poultry farming in supplementing rural livelihoods in Bundi district of Rajasthan. The study revealed that majority of households kept poultry under scavenging conditions resulting in lower unit cost. The net income per annum per household was estimated to be nearly Rs. 28000. Households used this increased cash income to pay for educational expenditures, medical emergencies, overcoming food shortages, and other little indulgences of life. Backyard poultry farming provided marketable surplus which was helpful in meeting the essential family needs.

Jha and Chakrabarti (2017) analyzed the backyard poultry farming as a source of livelihood in tribal village of Saraitoli, Ranchi district of Jharkhand. The total gross income generated in rearing of Divyan Red poultry birds was found to be of Rs. 88,808.00 per household. The gross return per bird was recorded Rs. 569.28 and the net return per bird including sale of eggs and meat was found Rs. 232.74. The net income obtained from the back yard poultry was recorded Rs. 3025.68 per household per year with B: C ratio of 1.69.

Kaine and Chukwuma (2017) assessed the profitability of backyard poultry farming in Ika South Local Government Area, Delta State, Nigeria. The study revealed that a sum of

naira 57,897 was realized by the average backyard poultry farmer and the return on investment was naira 1.39. This implied that for every one naira invested in poultry production, there was a return of naira1.39 indicating the profitability of poultry production.

Kumar *et al.,* (2018) assessed supplementing livelihoods of tribal women and nutritional security through backyard poultry in Adilabad district of Telangana, India. The study found that the average income generated by the women farmer in the village was Rs. 7454 with the initial investment of Rs. 680 by KVK, Adilabad. The average revenue output by 35 beneficiaries in the village was Rs. 2,60,922 with B:C ratio of 1:11which sustained the livelihood entity for tribal families.

Kumar *et al.,* (2019) assessed the backyard poultry as a resilient technology for augmenting farm income in Nacharam cluster village belonging to Khammam district, Telangana state. The results found that the average number of eggs produced by single bird was about 160 eggs per annum and the number of eggs produced per annum in case of five villages ranged from 33,600 to 40,960 and the annual income generated by sale of eggs (Rs.4/egg) ranged from Rs. 1,34,400 to Rs. 1,63,840. Some birds were sold for meat purpose and the income generated by sale of birds ranged from Rs. 5100 to Rs. 6750. “RajaSri” birds helped farmers to generate an average income ranging from Rs. 3513.7 to Rs. 4223.5.

Nirmala *et al*., (2020) assessed backyard poultry farming in West Godavari district of Andhra Pradesh. The study found that each beneficiary was supplied with 20 Rajasri chicks. The income generated through sale of eggs was Rs. 21,024 and birds was Rs. 6,388. The miscellaneous expenditure towards the feed, medicines, chemicals etc., towards rearing of each unit was about Rs. 6,300. Each woman beneficiary was able to generate a net income of Rs. 21,112 per unit of 20 birds. The income generated from backyard poultry sustained the tribal family with adequate income.

2.2 Marketing of backyard poultry birds and eggs

Mandal *et al.,* (2006) analyzed the marketing of backyard poultry in Bareilly district of Uttar Pradesh and found that majority (88 %) of the farmers did not sell the eggs and used them for domestic consumption, while the rest sold the surplus eggs. However, with regard to birds, majority (90 %) of the poultry farmers sold birds and (10 %) of the respondents retained them. About (89 %) of the poultry farmers marketed the eggs near the place of rearing, followed by consumer doorstep and village shopkeepers, whereas, majority (94.41 %)

of backyard poultry farmers sold birds at the rearing place followed by consumer doorstep, village shopkeepers, feriwala and village market. The average selling prices were Rs. 2.75 per egg and Rs. 120 per kg of bird weight.

Khandait *et al*., (2011) assessed the backyard poultry rearing practices at Bhandara district of Maharashtra and found that majority of farmers were selling the birds at their own doorstep and village market. About 22 per cent respondents were selling birds to local shop keepers and 19.17 per cent sold them to middleman. The birds were being sold on specific occasion, on demand of customers, on religious functions and to meet requirement of money.

Asem-Bansah *et al*., (2012) assessed the enhancing backyard poultry enterprise performance in the Techiman area of Ghana. The study found that itinerant traders in the communities and traders purchased the birds from farmers at the market centers. The farmers were found to purchase chickens from other farmers and sold them to the traders at the market centers or directly to traders. Besides the village itinerant traders, backyard poultry traders also sourced chickens and eggs directly from the community backyard poultry producers.

Tufail *et al*., (2012) analysed economics of backyard poultry in Tehsil Matta district of Pakistan. The study found that backyard chicken production is an important aspect of poultry farming on small scale and where a few birds were kept primarily for family use. The surplus birds and eggs were sold in the village or nearby market and the cash earned was utilized in household economy.

Wiratsudakul *et al*., (2014) examined modelling the dynamics of backyard chicken flows in traditional trade networks in Thailand. The study found that the trade of live backyard chickens was based on the activities of traders buying chickens from villages and gather them at home for slaughtering or selling to slaughterers of urban markets.

Rawat *et al*., (2016) analysed the performance of backyard poultry production reared by rural women in Mahoba district of Uttarpradesh. The study found that the marketing system was simple and direct and, in some cases, involved the middlemen. The study revealed that substantial amount of eggs produced was used for family self consumption. Good amount of eggs and birds (72.4 %) were sold by farmer to household directly and realised higher prices. About 27 per cent of the farmers sold chicken and eggs in the village market and majority the farmers did not sell female birds for meat. Only males were sold and these birds fetched very high prices, almost two to three times than the normal chicken rate.

Rahman (2017) analyzed the status and constraints of backyard poultry farming in Mizoram and indicated that the marketing system was simple and direct and only in some cases involved the middlemen. Eggs and birds were sold by farm households directly at higher prices. The study revealed that about 78 per cent of the respondents sold their poultry birds and eggs directly to the consumers while 22 per cent of the respondents sold in village market.

Sharma *et al*., (2018) examined the study of managemental practices of backyard poultry in Jammu district of Jammu and Kashmir. The study found that majority of the respondents was involved in sale of birds directly to the consumer as they came to the respondent's house to buy the poultry. Other ways of selling were: selling to shopkeeper, selling in village market and to middlemen.

Tripathy and Agarwal (2020) examined the value chain analysis of backyard poultry in Betanati block, Mayurbhanj district, Odisha and observed that 65 per cent of the farmers sold their products through direct marketing whereas only 35 per cent of the farmers sold their product through indirect marketing which involved two levels of middleman between farmer and consumer *i.e*., bird collectors and the retailer.

Nirmala *et al*., (2020) studied the backyard poultry farming in West Godavari district of Andhra Pradesh and it was found that sale of birds or eggs was the responsibility of women. The birds were marketed at the rate of Rs. 200 per kg of live body weight and eggs at the rate of Rs. 8 per egg. Most women indicated that they did not face any problem in selling birds and eggs and majority of them sold birds in the village itself and some of them sold birds in nearby markets.

2.3 Women participation in backyard poultry rearing

Ogunlade and Adebayo (2009) examined socio-economic status of women in rural poultry production in selected areas of Kwara State, Nigeria and observed that women were found to be the predominant owners of rural poultry. Most women reared the indigenous types of domestic fowl in extensive system of poultry production. Majority (50-70 %) of women involved in rural poultry production performed as traders also. The benefits enjoyed by the women through rural poultry production included income generation that necessitated to buy other essentials (10-70 %), savings (10-70 %), provision of meat for consumption (35-95 %), provision of meat to entertain special guests (50-97 %), provision of meat during

festive seasons (55-97 %), source of gifts (50-100 %), provision of employment opportunity through sale of eggs and chicken (40-75 %), and improvement of household diets through consumption of eggs and meats (30-95 %).

Sultana *et al*., (2012) assessed backyard poultry raising in Bangladesh in two villages: one in the northern district of Netrokona and another in the northwestern district of Rajshahi. It was found that some women (33 %) owned the poultry, because rearing and caring for backyard poultry was part of their household work. Poultry provided them with their own source of spending money and some of the household expenditures were paid solely by money raised from poultry. The income from poultry was useful to meet everyday household needs such as buying medicine, paying doctors' fees, and buying cooking ingredients, gifts and clothes for household members and repayment of loans. Poor households opined that during hard times when food was scarce, they sold their poultry or poultry by-products to meet daily needs.

Chaturvedani *et al*., (2014) examined decision making pattern followed by tribal backyard poultry rearers in Bastar district of Chhattisgarh. The study revealed that average independent women participation in poultry rearing was more in housing activities (67.50 %), health care activities (57.29 %), and feeding activities (53.89 %), but participated less in breeding (39.17 %), consumption (33.61 %), and marketing (21.88 %) activities. The time spent on these activities was also relatively less and they enjoyed relatively considerable liberty in taking decisions. Poultry rearing was a subsidiary occupation without much effect on household or daily routine.

Singh and Jadoun (2014) assessed the backyard poultry farming in West Bengal. The study indicated that rural women was empowered by backyard poultry farming practices and their involvement with poultry rearing projects increased their business acumen. It was found that poultry rearing programs empowered women by improving their economic condition and enhancing their ability to contribute to their family. The significant factor associated with the empowerment of rural women depended on their position and involvement in family affairs.

Dumrya *et al*., (2015) analysed the characterization of backyard poultry farming in Indian Sundarban region. The study revealed that majority (75.6 %) of the backyard poultry keepers in the Sunderbans region was middle-aged women and they played a significant role in backyard poultry farming which contributed towards their family's subsistence. Backyard poultry farming was believed to be in the domain of women and they were actively engaged

in crop husbandry, timber collection, fish seed catching and backyard poultry farming for long time.

Gupta *et al*., (2018) analysed empowering rural women through backyard poultry farming in tribal district of West Bengal. The study found that backyard poultry farming was an important livelihood option among the tribal Self Help Group member and farm women in Bankura especially with Haringhata black. It not only met their nutritional security but also supported in earning additional income and as a whole increased their empowerment status. This livelihood option empowered women economically, socially and even in family as decision making authority.

Kumar *et al*., (2018) assessed supplementing livelihoods of tribal women and nutritional security through backyard poultry in Adilabad district of Telangana, India. The study indicated backyard poultry farming as one of the best unique livelihood opportunities for the tribal women. It could generate subsidiary income by utilizing backyard wastes and provided year-round protein rich food at relatively low cost to the family.

Bharti *et al*., (2019) analysed the benefits and constraints as perceived by rural women in backyard poultry farming in Bundelkhand region of Uttar Pradesh. Women were found to be the predominant owners of rural poultry which served as a small-scale business for income generation. The enterprise provided regular income using little inputs and the production could be solely managed by women in the households.

Nirmala *et al*., (2020) assessed backyard poultry farming in West Godavari district of Andhra Pradesh. The study found that the involvement of women was more in housing, feeding, watering, healthcare, and breeding which contributed to a larger extent in increasing the household income of the family. The income generated from backyard poultry rearing was invested for household celebrations, recreation purpose, as a gift to relatives and also to extend the poultry flock production depending upon the felt needs.

Bharti and Sagar (2020) examined the production performance of backyard poultry reared by rural women in Budelkhand region of Uttar Pradesh. The study found that majority (88.75%) of the rural women reared backyard poultry as source of income, followed by both (11.25%) as source of income and own consumption. None of the rural women reared backyard poultry only for own consumption purpose. Backyard poultry production served as a regular income earner with very less resources available at their premises. Management of

poultry along with household activities was found to be an effective tool for empowerment of women.

2.4 Consumer preference for backyard poultry birds and eggs

Raha (2000) analysed the poultry industry in Bangladesh and found that indigenous chicken was better than broilers in terms of taste and quality of meat. Indigenous chicken were sold at much higher prices than the broiler. The consumers preferred brown-shelled eggs to white-shelled eggs owing to nutrition and the prices of brown-shelled eggs were higher than that of white-shelled eggs in the market.

Asem-Bansah *et al.,* (2012) assessed the backyard poultry enterprise performance in the Techiman area of Ghana. The study found that backyard poultry was preferred for the taste and toughness of the meat that withstood the long cooking methods used in preparing local dishes.

Atuahene *et al.,* (2013) conducted a study on the consumers perception and preference for local poultry meat in the Kumasi Metropolis of Ghana. Among the 50 respondents, (60 %) of the respondents strongly perceived that local poultry meat had better taste. On perception related to health, majority (46 %) strongly agreed that local poultry meat was healthy and only (20 %) agreed that local poultry meat was affordable.

Rawat *et al*., (2016) analysed the study on the performance of backyard poultry production reared by rural woman in Mahoba district of Uttarpradesh. The study revealed that substantial amount of eggs produced was used for family self consumption, which served as very good protein source particularly in winter season, when temperature and production increases. About 28 per cent of the farmers who sold chicken and eggs in the village market attributed to the consumer preference for local chicken and eggs because of better flavour and deep coloured yolk.

Augustine and Shukla (2017) assessed the consumer preferences and market potential for the backyard poultry rearing system in Kumi district of Uganda. Poultry traders in the study area traded mainly with indigenous chicken breeds as the customers preferred it due to taste and less chemical residues. Around 80 per cent of the consumers preferred backyard chickens compared to other chicken or poultry breeds. The market potential for poultry was computed to be 3,290,588 birds per year, for which 20 per cent was for broilers (658,118 birds) and the rest being for backyard poultry (2,632,470 birds).

Rahman *et al*., (2017) examined the poultry industry of Bangladesh. The study found that poultry meat and eggs available in Bangladesh were mostly originated from locally grown backyard poultry and also from small and large-scale poultry enterprises. High purchasing power of the people and positive attitude towards fulfilment of nutritional requirements undoubtedly facilitated revolution in the poultry sector and increase in the number of health conscious, educated people in the society, fuelled purchasing power of backyard poultry products.

Gupta *et al*., (2018) analysed empowering rural women through backyard poultry farming in tribal district of West Bengal. The study revealed that tribals were well aware about the taste of desi chicks and were accustomed with rearing birds with indigenous technique. The adoption of Haringhata black poultry breed accelerated positive and vertical growth as taste of these bird beat other locally available birds like broiler and Rhode Island Red.

Pal *et al.,* (2020) analysed the review on backyard poultry farming in resource utilization for better livelihood of the rural population. The study found that consumers had liking for eggs and meat of indigenous poultry compared to those farm breed chickens. The consumers were ready to pay higher prices for local native hen eggs and chicken meat as the birds were raised in natural environment with less stress which resulted in good quality of chicken and eggs in comparison to chicken as well eggs produced at commercial poultry farm.

2.5 Constraints in production and marketing of backyard poultry birds and eggs

Mandal *et al.,* (2006) analyzed the backyard poultry farming in Bareilly district of Uttar Pradesh. The study revealed that mortality due to high incidence of disease was the major constraint followed by lack of suitable germplasm (91.25 %), attack of predators (86.67 %), mortality during hatching (75.00 %), lack of financial support (67.50 %), and high cost of inputs/chicks (54.56 %) as the problems faced by farmers.

Thakur *et al*., (2012) assessed the status of backyard poultry farming in Himalayan regions of India. The study found that majority (88.75 %) of the households suffered from inadequate availability of superior stock, poultry ailments like ecto-parasites, fever, dullness (46.25 %), poor productivity (42.5 %) and problem of predators (40 %) were identified as major constraints faced by farmers.

Deka *et al*., (2013) identified the constraints of backyard poultry farming by tribal community of Jorhat district in Assam. They found that the mortality was due to high incidence of disease (100 %), followed by low production potential of native birds (91 %), low hatchability/early chick mortality/non-availability of day-old chicks round the year (84 %), lack of financial support (67 %), lack of technical knowledge (52 %), lack of feed ingredients (34 %), weak market linkages (30 %) and attack of predators (13 %) as the most serious constraints faced by the farmers.

Dumrya *et al*., (2015) examined characterization of backyard poultry farming in Indian Sundarban region. The respondents opined that the primary reason for financial loss in backyard poultry farming was high incidence of poultry diseases, followed by attack of predators, unavailablity of suitable germplasm, lack of financial support and also they reported that there was frequent outbreaks of new castle disease in the region.

Chaturvedani *et al*., (2016) examined health status of backyard poultry in Bastar district of Chhattisgarh. The study revealed that the major cause of mortality was due to attack of predator followed by outbreak of diseases due to poor housing and health care facilities in the tribal villages that led to overcrowding, cannibalism and huddling etc. They also reported influenza as the major disease encountered in the year 2012 whereas for all the time, they believed new castle disease was the most devastating disease in free range systems.

Rawat *et al*., (2016) analysed the performance of backyard poultry production reared by rural women in Mahoba district of Uttar Pradesh. The study found that the major constraints were those related to with predators particularly dogs, newla and cats, under extensive system of management and mainly during scavenging, birds became vulnerable to predators. Other constrains were diseases, lack of health services, finance problem and availability of improved breeds.

Singh *et al*., (2016) assessed the performance of backyard poultry farming in Bageshwar district of Uttarakhand. The authors found that poultry farmers faced constraints in adoption of backyard poultry farming such as lack of technical knowledge (71.50 %), high mortality in day-old chicks (63.50 %), inadequate availability of chicks and its feed (51.00 %), economic problems (48.00 %) etc., were the constraints faced by farmers.

Jha and Chakrabarti (2017) analyzed the backyard poultry farming as a source of livelihood in tribal village of Saraitoli, Ranchi district of Jharkhand. The study revealed the

constraints experienced in backyard poultry production included diseases, protection against various predators, better feeds and medicine availability, separate house, improved breed, proper marketing, training and management for efficient back yard poultry farming. The authors suggested for improvement of the past traditional system by introduction of modern intensive production methods with new breeds and improved preventive disease control measures.

Rahman (2017) analysed the status and constraints of backyard poultry production amongst the women in Aizawl and Mamit districts of Mizoram. The author found that local chickens were reared for dual purpose predominately under free range scavenging system by providing kitchen leftover, insects, worms, crop residues, grass and grains as feed materials. The farmers did not practice vaccination and deworming of birds and mortality rate in birds due to Ranikhet disease was the highest, followed by fowl pox, greenish diarrhoea, respiratory problems etc. The major constraints in backyard poultry rearing were non-availability of improved chicks for rearing, predators and occurrence of diseases.

Bharti *et al*., (2019) examined the benefits and constraints as perceived by rural women in backyard poultry farming in Bundelkhand region of Uttar Pradesh. The study revealed that attack by predator was the major constraint reported by 92.5 per cent of rural women, followed by complaints by neighbours (88.75 %), spoilage of egg in summer (63.75 %), unstable price (60 %), lack of breeding stock (52.5 %), low productivity (43.8 %), low hatchability (41.25 %), lack of protection against diseases (41.5 %), lack of adequate scavenging land (38.75 %), and lack of family support (2.5 %) were the problems faced by women in rural poultry.

METHODOLOGY

III METHODOLOGY

This chapter offers an overview of the current study's sample plan, conceptual framework, and analytical techniques. Following are the sections that make up this chapter.

3.1 Description of the study area

3.2 Sampling framework

3.3 Nature and sources of data

3.4 Analytical techniques

3.1 Description of the study area

The South Bengaluru was purposively selected for the study. A good number of farmers are practising backyard poultry rearing. Bengaluru South taluk of Bengaluru Urban district and Ramanagara taluk of Ramanagara district were purposively selected for the study. The data / information collected pertained to the year 2021-22.

Between North Latitude 12.9700° and East Longitude 77.6536° is where the Bengaluru Urban District is located. It is bordered by the Tamil Nadu's Krishnagiri district on the South, the Bengaluru Rural district on the East and North, and the Ramanagara district on the West. When Bengaluru District was split into Bengaluru Urban and Bengaluru Rural districts in 1986, Bengaluru Urban district was created. There are five taluks in the Bengaluru Urban district: Yelahanka, Anekal, Bengaluru North, and Bengaluru South. The Bengaluru Urban district consists of the city of Bengaluru. There are 588 villages, nine Municipal Corporations, and 20 hoblies in the district.

The Bengaluru Urban District covers a total of 2,19,600 acres of land area (Table 2). According to 2016 statistics, 5,055 hectares of forest cover and about 3,889 hectares of the barren terrain are suitable for cultivation, whereas 1,25,674 hectares were unsuitable for agriculture. According to the 2011 Census, there were 96,21,551 people living in the district, and 87.67 per cent of them were literate.

Bengaluru Urban is having a good climate. The district's climate is described as a four-season, seasonally dry tropical savanna climate. From December to February, there is a dry season with clear, sunny days. From March to May, there is a summer, and from June to

September, there is a south-west monsoon season. The post-monsoon or retreating monsoon season lasts from October through November. Bengaluru's climate is characterised by variety of temperatures, from a high of 33°C in April to a low of 14°C in October. The two rainy seasons, from June to September and from October to November, coincide with the south-west and north-east monsoons but occur one after the other with opposing wind patterns.

In the Bengaluru Urban district, maize, ragi, horsegram, and oil seeds are the main food crops grown. The district's main horticultural products include grapes, mango, banana, sapota, papaya, and pomegranate. Cattle, buffaloes, sheep, goats, chickens, and rabbits are the main types of livestock that are raised in the district as a means of subsistence.

Ramanagara is located between the latitudes of 77° 06' to 77° 34' in the east and 12° 24' to 13° 09' in the north. About 50 miles to the southwest of Bengaluru is Ramanagara. In 2007, the Ramanagara district, which had previously been a part of Bengaluru Rural district, underwent a split and reorganisation. Ramanagara, Channapatna, Magadi, and Kanakapura are its four taluks. The district shares the borders with Tamil Nadu state in the South, Bengaluru Urban in the East, Bengaluru Rural in the north-east, Tumakuru in the north-west, Mandya in the West, and Chamarajanagar in the south-west. Its typical elevation is 747 metres (2,450 feet).

Ramanagara district has 3,55,912 ha of land in its whole (Table 4). According to data from 2015, there were 69,946 hectares of total forest cover. In contrast to the 27,671 hectares of non-agricultural land, there were 1,178 hectares of cultivable barren land. The literacy rate was 69.22 per cent and there were 10,82,636 people living there.

The main fruit and vegetable crops planted in the Ramanagara district are tomatoes, potatoes, beans, chillies, brinjal, cabbage, and cauliflower, while the main horticultural crops grown are grapes, mangoes, bananas, sapotas, and guavas. In the district, animal husbandry is a significant ancillary occupation. Development of livestock is significant due to Bengaluru's vicinity because it gives the farming community more chances for work and money. In the district, raising backyard poultry, sheep and goats are well-liked allied activity. In addition to increasing the farmers' resources, they use organic manure to improve the soil's fertility.

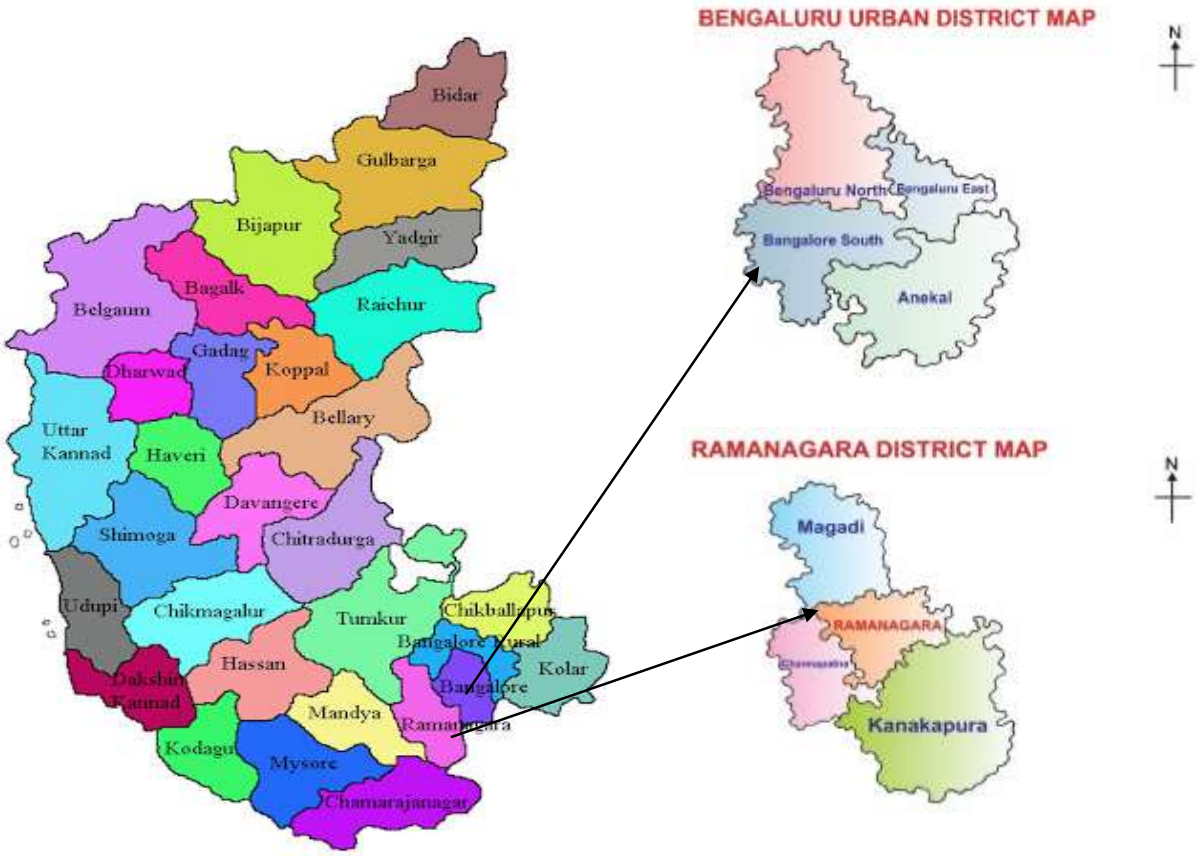

Fig. 1: Map of study area - Bengaluru Urban and Ramanagara districts

Table 2: Geographical and demographic profile of Bengaluru Urban district

Sl. No.	Particulars		Figures
1.	Geographical area (ha.)		2,19,600
2.	Forest cover (ha.)		5055
3.	Cultivable barren land (ha.)		3889
4.	Non-agricultural land (ha.)		1,25,674
6.	Taluk (nos.)		5
8.	Gram Panchayath (nos.)		96
9.	Villages (nos.)		588
10.	Population (nos.)	Male	50,22,661
		Female	45,98,890
		Total	96,21,551
12.	Literacy rate (%)		87.67
13.	Annual rainfall (mm)		677
14.	Temperature	Maximum	39.2^0 C
		Minimum	19^0 C

Note: Data pertains to 2016-17

Source: www.bengaluruurban.nic.in

Table 3: Livestock population of Bengaluru Urban district

Sl. No.	Particulars	Number
1.	Cattle	1,53,861
2.	Buffalo	11,168
3.	Goat	62,464
4.	Sheep	82,873
6.	Pig	28,046
7.	Poultry	13,02,173

Note: Data pertains to 20^{th} Livestock Census 2019

Source: www.ahvs.kar.nic.in

Table 4: Geographical and demographic profile of Ramanagara district

Sl. No.	Particulars		Figures
1.	Geographical area (ha.)		3,55,912
2.	Forest cover (ha.)		69,946
3.	Cultivable barren land (ha.)		1,178
4.	Non-agricultural land (ha.)		27,671
6.	Taluk (nos.)		4
8.	Gram Panchayath (nos.)		127
9.	Villages (nos.)		823
10.	Population (nos.)	Male	5,48,008
		Female	5,34,628
		Total	10,82,636
12.	Literacy rate (%)		69.22
13.	Annual rainfall (mm)		810.3
14.	Temperature	Maximum	31^0 C
		Minimum	14^0 C

Note: Data pertains to 2015-16

Source: www.ramanagara.nic.in

Table 5: Livestock population of Ramanagara district

Sl. No.	Particulars	Number
1.	Cattle	2,87,502
2.	Buffalo	19,644
3.	Goat	1,50,130
4.	Sheep	1,27,988
6.	Pig	7,102
7.	Poultry	23,56,885

Note: Data pertains to 20th Livestock Census 2019

Source: www.ahvs.kar.nic.in

3.2 Sampling framework

The present study was confined to analyse the profitability of backyard poultry enterprises; marketing of backyard poultry birds and eggs; women participation in backyard poultry rearing; consumer preference for backyard poultry birds and eggs; and constraints in production and marketing of backyard poultry birds and eggs.

3.2.1 Selection of study area

For the present study, Vidhana Soudha, which is in the middle of Bengaluru city, was purposefully chosen as the reference point for the Southern Bengaluru.

The villages in Bengaluru Urban and Ramanagara district were randomly selected for the study. Purposive sampling method was adopted for selection of 40 backyard poultry rearers. In addition, data was elicited from 90 consumers in Bengaluru city and five butchers and five traders in the study area.

3.2.2 Selection of sample farmers

South Bengaluru was purposively selected for the study. Poultry farming assumes special significance in Bengaluru due to the increasing industrialization, increasing population, urbanization, changing food habits, nearness to the Bengaluru city and awareness about health care etc., that are in turn contributing towards rising demand for poultry products. The villages that were selected randomly included, Gulakmale, Gadipalya, Gollahalli, Guttepalya, Thattaguppe of Bengaluru South taluk of Bengaluru urban districts and other villages such as Bannikuppe, Avaregere, Tibbengowdandoddi, Kaggalipura, Palabhovidoddi, Hosadoddi, Gollarapalya, Shyanumangala, Karenahalli, Bairamangala of Ramanagara taluk of Ramanagara districts.

3.3 Nature and sources of data

The primary data for the study were obtained from the sample farmers through personal interview method with the help of a pre-tested structured schedule.

The collected data pertains to the agricultural year 2021-22. As most of the respondents did not maintain the records of expenditure and receipts of farm enterprises, the data collected were based on the memory of the respondents.

The data elicited related to (a) profitability of backyard poultry rearing; (b) marketing in backyard poultry rearing; (c) participation of women in backyard poultry rearing; (d) consumer preferences for backyard poultry birds and eggs; and (e) production and marketing constraints in backyard poultry rearing.

3.4 Analytical techniques

The methods of analysis followed in the study are presented under the following sub-headings.

3.4.1 Cost and returns analysis

3.4.2 Shepherd's approach

3.4.3 Descriptive statistics

3.4.4 Logit model

3.4.5 Garrett's ranking technique

3.4.1 Cost and returns analysis

In order to determine the profitability of backyard poultry farmers, cost and returns analysis was used. Cost and return were calculated by considering the variable cost, fixed cost, and gross returns for production corresponding to the average size of the backyard poultry birds. Variable cost includes the feed, labour, electricity charges, veterinary care, chick cost, water charges and interest on working capital.

1. **Feed cost:** The feed cost was worked out by taking into consideration the quantity of feed used and their respective prices.

2. **Cost of chicks**: The farmers purchased the chicks from local rearers as well as traders who delivered the chicks to the doorsteps and cost of chicks was different from traders to local rearers.

3. **Cost of labour**: The labour engaged for conducting different activities in backyard poultry rearing like feeding, watering, supervision of chicks, maintenance of temperature and miscellaneous works were executed by family labour. Hence the family labour cost

was imputed by considering the opportunity cost of labour *i.e.*, time spent on rearing backyard poultry birds. (Rs. 4,500/month)

4. **Miscellaneous charges**: Actual expenditure incurred towards the veterinary care and water charges were considered under miscellaneous cost.

5. **Interest on working capital:** Interest rate on working capital was worked out at the rate of seven per cent per annum (The interest rate charged by Commercial Banks for medium term loan is 7 %).

Fixed cost includes the depreciation on cages, depreciation on equipment and interest on working capital.

1. **Depreciation costs:** Depreciation is calculated for the equipments which consists of feeder, drinker, bamboo basket coop and backyard poultry cage chargers based on their purchase value using the straight-line formula

$$\text{Annual depreciation} = \frac{\text{Purchase value} - \text{Junk value}}{\text{Economic life of the asset}}$$

2. **Interest on fixed capital:** Interest rate on fixed capital was worked out at the rate of 12 per cent per annum (The interest rate charged by Commercial Banks for long term loan is 12 %).

$$\text{Total cost} = \text{Total variable cost} + \text{Total fixed cost}$$

Gross returns is the revenue obtained from the sales of birds, sale of eggs, sale of manure to the nearest households and even nearby markets in the villages. Birds include the sale of hen, cock and spent hen. Eggs were sold to the nearest retailers' shop.

$$\text{Net returns} = \text{Gross returns} - \text{Total cost}$$

3.4.2 Shepherd's approach

In this study, Shepherd's approach was used to determine the marketing efficiency of backyard poultry birds and eggs in the study area. Shepherd suggested that the ratio of the total value of goods marketed to the marketing cost may be used as a measure of marketing efficiency. The higher the ratio, the higher efficiency and vice versa.

$$\text{Marketing Efficiency} = \frac{\text{Value of goods sold (V)}}{\text{Total marketing cost (I)}}$$

3.4.3 Descriptive statistics

For the study, descriptive statistics such as mean and percentages were used for analysing the data pertaining to the study.

3.4.4 Logit model

An attempt was made to study the consumer preference and motivating factors to prefer backyard poultry chicken rather than broiler chicken by the sample consumers. The relationship between socio-economic characteristics of the consumers and their backyard poultry chicken purchase is analyzed using logit function.

In this analysis, the dependent variable (Y_i), backyard poultry chicken is nutritional value and taste or not. If Y_i is the random variable (dichotomous), it can be assumed that Y takes the values 0 or 1, where 1 represents when the consumer responds positively to nutritional value and taste of backyard poultry chicken otherwise it takes the value 0. The model is:

Motivation for purchase of backyard poultry chicken (yes/x_i) = $\alpha + \sum\beta_i X_i + e$

where,

Y_i = '1' if consumer gives positive answer to particular variable, otherwise '0'

α = constant term

X_i = independent variable (socio-demographic factors of the consumers)

β_i = logistic coefficients for the i^{th} independent variable (log odds ratio)

e= error term

The explanatory variables specified in the model are age (in years), gender (male = 1, female = 0), frequency of purchase (more than once per week = 0, weekly = 1, fortnightly = 2, more than once per month = 3, monthly = 4) experience in purchasing (in years), quantity per purchase (in kg).

The data was tabulated, coded and analyzed using GRETL statistical computer programme. The depended variable (positive response to nutritional value and taste of backyard poultry chicken) was regressed on selected explanatory variables to identify the variables which highly influence the purchase of backyard poultry chicken.

3.4.5 Garrett's ranking technique

In this study, Garrett's ranking technique was used to rank the production and marketing constraints faced by farmers practising backyard poultry rearing in the study area. The order of the merit given by the respondents was converted into per cent position using the formula.

Per cent position $= 100*(R_{ij} - 0.5) / N_j$

where,

R_{ij} = Rank given for i^{th} item by j^{th} individual

N_j = Number of items ranked by j^{th} 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 factors / constraint were ranked, following the decision criteria that higher the value, more important is the order of preference by respondents.

RESULTS AND DISCUSSION

IV RESULTS AND DISCUSSION

In accordance with objectives of the study, the findings are presented and discussed under the following headings in this chapter.

4.1. Socio-economic characteristics of backyard poultry rearers

4.2. Land holding pattern of backyard poultry rearers

4.3. Livestock possession by backyard poultry rearers

4.4. Composition of backyard poultry flock reared by sample respondents

4.5. Profitability of backyard poultry rearing

4.6. Marketing of backyard poultry birds and eggs

4.7. Women participation in backyard poultry rearing

4.8. Consumer preference for backyard poultry meat and eggs

4.9. Constraints in backyard poultry rearing

4.1 Socio-economic characteristics of backyard poultry rearers

The sample comprised of 40 backyard poultry rearers in the area under study, *viz*., South Bengaluru. Table 6 provides information about the socio-economic characteristics of backyard poultry farmers.

4.1.1 Age of poultry rearers

Age is a key consideration when making decisions about the administration of a farm, including those regarding investments, resource distribution, marketing, etc. Age of family members can be used to gauge how important family decisions are to choose the agricultural enterprises and presence of active labour force on the farm.

Majority (55 %) of the backyard poultry rearers belonged to the age group of above 50 years followed by age group of 30 to 50 years (25 %) and age group of 20 to 30 years (20 %). This revealed that majority of the backyard poultry rearers had adequate experience in backyard poultry rearing, who were also conservative and followed traditional practices.

Table 6: Socio-economic characteristics of backyard poultry rearers in South Bengaluru

(n = 40)

Sl. No.	Particulars	Number	Per cent
1.	**Age (years)**		
	a. 20 to 30	8.00	20.00
	b. 30 to 50	10.00	25.00
	c. Above 50	22.00	55.00
2.	**Education level**		
	a. Illiterate	22.00	55.00
	b. Primary school	11.00	27.50
	c. SSLC	7.00	17.50
3.	**Family type**		
	a. Nuclear family	34.00	85.00
	b. Joint family	6.00	15.00
4.	**Family composition (nos.)**		
	a. Men	2.00*	40.00
	b. Women	2.00*	40.00
	c. Children	1.00*	20.00
5.	**Occupation**		
	a. Backyard poultry farming as main occupation	8.00	20.00
	b. Backyard poultry farming as subsidiary occupation	32.00	80.00

Note: * rounded-off averages

4.1.2 Education of poultry rearers

The role of education becomes highly significant, when one must make judgments regarding the adoption of new technologies and allied businesses on the farm. Determining a farming community's capacity to learn new skills and to make wise decisions on the adoption of new technologies and innovations in agriculture is the analysis of the educational status of the family members.

Majority (55 %) of the backyard poultry rearers were illiterates, who practised backyard poultry rearing as an old-age profession, followed by those who had education up to primary school (27.50 %), and SSLC level (17.50 %).

4.1.3 Family type of poultry rearers

The size and composition of the family have a significant role in the decision-making process for managing the farm business and are significant indications of the family social and economic well-being. This is true because only family members handle the majority of farm tasks.

Majority (85 %) of the families of backyard poultry rearers were nuclear while the rest (15 %) had joint families. This could be explained by the fact that the data was gathered in and around Bengaluru, which is rapidly urbanizing. The average family size was five consisting of two men, two women, and one child.

4.1.4 Occupation of poultry rearers

The household income is directly associated with the type of occupation of family members as per their main and subsidiary occupations. Large number of labours and farmers are involved in backyard rearing as a subsidiary occupation to support their family income and to meet the nutritional requirement of the family.

Majority (80 %) of the sample farmers carried backyard poultry rearing as a subsidiary occupation, while for the rest (20 %), it was the main occupation. Among livestock-based activities, backyard poultry rearing is one of the major allied enterprises of farmers in the study area.

4.2 Land holding pattern of backyard poultry rearers

The land holding pattern of sample backyard poultry rearers is presented in Table 7. Land is a crucial component of farming because it is the primary natural resource that farmers have access to for managing other farm enterprises as well as carrying out crop production. The size of the land holding is a significant consideration for the adoption of various agricultural enterprises, mostly crops and fruits. The respondents chose backyard poultry as a potential business to boost their household income because of limited land holding.

Table 7: Land holding pattern of backyard poultry rearers in South Bengaluru

(n = 40)

Sl. No.	Particulars	Land holding (in acres)	Per cent
1.	Dryland	1.20	57.14
2.	Irrigated land	0.67	31.90
3.	Garden land	0.23	10.96
	Total	**2.10**	**100**

The average farm size of backyard poultry rearers was 2.1 acres. About 57 per cent of the farm was dryland followed by irrigated land (31.90 %) and garden land (10.95 %).

Ragi, maize, and cowpea were the major crops grown by backyard poultry rearers in the study area. The dry land crop ragi, which matures quickly and may be fed to livestock to help them gain weight, can tolerate extreme drought conditions. Due to its dual usage as food and fodder, maize is the ideal crop for dryland areas. Cowpea is well suited for double and inter cropping systems, the green mature pods of the cowpea are utilised for human food and the leftover fodder is used as cattle feed.

The primary water source in the research area for agriculture was rainfall and groundwater from borewells which form the major sources of irrigation. Hence, on an average, half of the farm was rainfed. Due to small size holding of garden land, they have tried to utilize the available land for fruit crops.

4.3 Livestock possession by backyard poultry rearers

The livestock possession of backyard poultry rearers is presented in Table 8. In addition to poultry, the sample farmers also reared sheep, goat, and cattle as supplementary enterprises. The average flock size of backyard poultry birds was 28, while that of sheep, goat, and cattle enterprises was six, five, and three, respectively. The sample farmers in the study area reared indigenous backyard breeds such as local / non-descript, Giriraja, Swarnadhara, *etc*.

Table 8: Livestock possession by backyard poultry rearers in South Bengaluru

(n = 40)

Sl. No.	Particulars	Number
1.	Sheep	6.00*
2.	Goat	5.00*
3.	Cattle	3.00*
4.	Backyard poultry birds	28.00*

Note: * rounded-off averages

The sample farmers reared local sheep breeds such as local / non-descript, Bannur, Deccani, *etc*., goat breeds such as local / non-descript, Sirohi, Osmanabadi and Jamunapari, *etc*., and cattle breeds such as local, Jersey, and Holstein Friesian, *etc*. In dry, arid, and semi-arid regions where agricultural farming is not very productive, sheep and goats are two major livestock species because income from crop farming alone is insufficient and unstable. Sheep and goat husbandry helps a large number of landless, marginal, and small farmers to improve their prospects for living.

4.4 Composition of backyard poultry flock reared by sample respondents

The composition of the backyard flock reared by sample respondents is presented in Table 9. As mentioned earlier, the average size of the backyard flock maintained by farmers was 28. Majority (64.29 %) of the flock comprised of hens followed by cocks (21.43 %), pullets (10.71 %), and cockerels (3.57 %). For optimum production of chicks, a cock:hen ratio of 1:8 is recommended. However, the sample farmers have not maintained the recommended cock:hen ratio on their farms.

During fifth and sixth weeks, chicks will go through visible growth changes and then birds are referred to as pullets and cockerels. Pullets are young female chicks under one year of age and young males under one year of age are called cockerels.

Table 9: Composition of backyard poultry flock reared by sample respondents in South Bengaluru

(n = 40)

Sl. No.	Particulars	Number	Per cent
1.	Pullets	3.00*	10.71
2.	Cockerels	1.00*	3.57
3.	Cocks	6.00*	21.43
4.	Hens	18.00*	64.29
	Total	**28.00***	**100.00**

Note: * rounded-off averages

Hen is the female bird, which starts laying its first egg around 18 weeks of age and continues up to five years, the annual egg production on an average is 130 eggs per annum, and the male bird is called cock. The average weight of backyard poultry hen will be around 1.5 kg, whereas, cock weights around 2 kg.

4.5. Profitability of backyard poultry rearing

4.5.1 Cost of backyard poultry rearing

The costs and returns structure of backyard poultry rearing is presented in table 10. The average number of backyard poultry birds in the study area was found to be 28 birds, with flock size ranging from 20 to 28 birds. The total cost incurred per annum for rearing a flock size of 28 birds was estimated to be Rs. 8,711.02, out of which, fixed cost and variable costs accounted for 5.36 per cent (Rs. 467.17), and 94.64 per cent (Rs.8,243.85), respectively.

Among the variable costs, labour was the major cost accounting for 66.60 per cent of the total variable cost, followed by feed (16.62 %), veterinary care (4.67 %), cost of chicks (3.64 %), and water (1.94 %). Fig. 2 presents the variable cost incurred in backyard poultry rearing.

Backyard poultry rearing needs a substantial amount of human care such as feeding, watering, supervision of chicks, maintenance of temperature, and miscellaneous works. In the case of sample backyard poultry rearers, the requirement of labour was predominantly met by

family labour. Based on the prevailing wage rate (Rs. 4,500 per month) labour cost was imputed by considering the opportunity cost of labour *i.e.*, time spent on rearing backyard poultry birds was hardly one hour a day, which amounted to Rs. 5490.00 for rearing an average flock size of 28 birds.

Table 10: Cost and returns of backyard poultry rearing in South Bengaluru

(per annum)

Sl. No.	Particulars	Amount (Rs.)	Percentage
1.	**Variable costs**		
	a. Feed	1369.85	16.62
	b. Labour	5490.00	66.60
	c. Veterinary care	385.00	4.67
	d. Cost of chicks	300.00	3.64
	e. Water charges	159.69	1.94
	f. Interest on working capital @ 7 %	539.31	6.54
	Sub-total	**8,243.85**	**100.00**
2.	**Fixed costs**		
	a. Depreciation on cage / shed	320.74	68.66
	b. Depreciation on equipment	96.38	20.63
	c. Interest on fixed capital @ 12 %	50.05	10.71
	Sub-total	**467.17**	**100.00**
	Total cost	**8,711.02**	
3.	**Returns**		
	a. Sale of backyard poultry birds		
	i. Hen	1650.00	7.85
	ii. Cock	8400.00	40.00
	b. Sale of eggs	9600.00	45.71
	c. Sale of manure	1350.00	6.43
	Gross returns	**21000.00**	**100.00**
	Net returns	**12,288.98**	

Note: Average backyard poultry birds flock size - 28

The main source of feed for the sample rearers for rearing backyard poultry bird was rice, ragi, jowar, *etc*. Under free range conditions, backyard poultry birds meet their feed requirement through scavenging along with handful of kitchen waste in the morning and evening. The birds are also fed with extra feed such as rice, ragi, and jowar, which is locally available and helps in gaining weight. As most of the rearers grow these crops on their own land, this leads to low investment in rearing of backyard poultry birds. The feed cost was imputed based on the prevailing market prices, and accordingly, the cost was worked out which accounted for Rs. 1369.85.

The other variable costs of backyard poultry rearing were expenses incurred towards veterinary care, cost of chicks, and water charges. In the study area, the average cost incurred for veterinary care amounted to Rs. 385.00. Backyard poultry birds need negligible veterinary care. However, the rearers visited veterinary hospital when they observed diseases in the birds such as Marek's disease, Ranikhet disease, Fowl fox, etc. The cost incurred for purchasing the chicks was Rs. 300.00. The chicks were purchased from local traders, nearby households, and some rearers also purchased improved backyard poultry breeds from Hesaragatta and Hebbal.

The main source of water for the backyard poultry rearers was from municipal water, common property resource (water troughs constructed by Gram Panchayath), and their own farm (borewell). Birds need constant access to fresh, clean drinking water based on different seasons. The water charges were imputed based on the prevailing market prices and accordingly, the cost was worked out which accounted to Rs. 159.69.

Among the fixed costs, depreciation on cages / sheds was the major cost accounting for 68.66 per cent of total fixed cost, followed by depreciation on equipment (20.63 %), and interest on fixed capital constituted (10.71 %).

In the study area, it was found that some of the rearers used cages / sheds to provide shelter to birds during night time. Sheds are prepared by using locally available materials such as wire nets, wood, mud, metal sheets, *etc*. The depreciation on cages / sheds accounted to be Rs. 320.74, and equipment such as feeder, waterer, and bamboo basket coop were used for feeding and managing of birds, which accounted to Rs. 96.38.

The above findings are similar to the study conducted by Nirmala *et al*., (2020) in assessing the backyard poultry farming in West Godavari district of Andhra Pradesh. The

sample respondents were able to generate a net income of Rs. 21,112 per unit of 20 Rajasri birds reared by them, and sustained the tribal family with adequate income.

4.5.2 Returns from backyard poultry rearing

The returns realized from backyard poultry rearing included hen and cock, sale of eggs and sale of manure which accounted for 7.85 per cent, 40.00 per cent, 45.71 per cent and 6.43 per cent of the gross returns, respectively. The annual gross returns obtained from rearing a flock size of 28 birds was Rs. 21,000, resulting in net returns of Rs. 12,288.98, and the net returns per bird was estimated to be Rs. 438.89. Fig. 3 represents the returns incurred from backyard poultry rearing.

Cocks are sold to higher price when compared to hen *i.e.*, almost double the price of the hen mainly during the festival season where each cock costs around Rs. 800 to Rs. 1,000. Birds are sacrificed to the goddess in the villages. Rearers prefer selling cocks much before hens as they require more feed when compared to hens. Rearers retain hens for egg production and breeding purposes. However, once their egg laying capacity decrease, the hens are sold at around Rs. 450 to Rs. 550. In the villages, after meeting the household consumption, eggs are sold to nearby households and retailers based on the prevailing prices in the market.

Hence, the null hypothesis that “backyard poultry is financially viable” has been accepted.

The above findings are similar to the study conducted by Tufail *et al*., (2012) in their economic analysis of backyard poultry farming in Tehsil Matta district of Pakistan. The study found that gross revenue generated per bird was Rs. 227.89, from which Rs. 219.23 was earned from eggs which was about 96.2 per cent of the gross income. The annual total cost per bird was Rs. 79.23, and the annual net revenue per bird was Rs. 148.66.

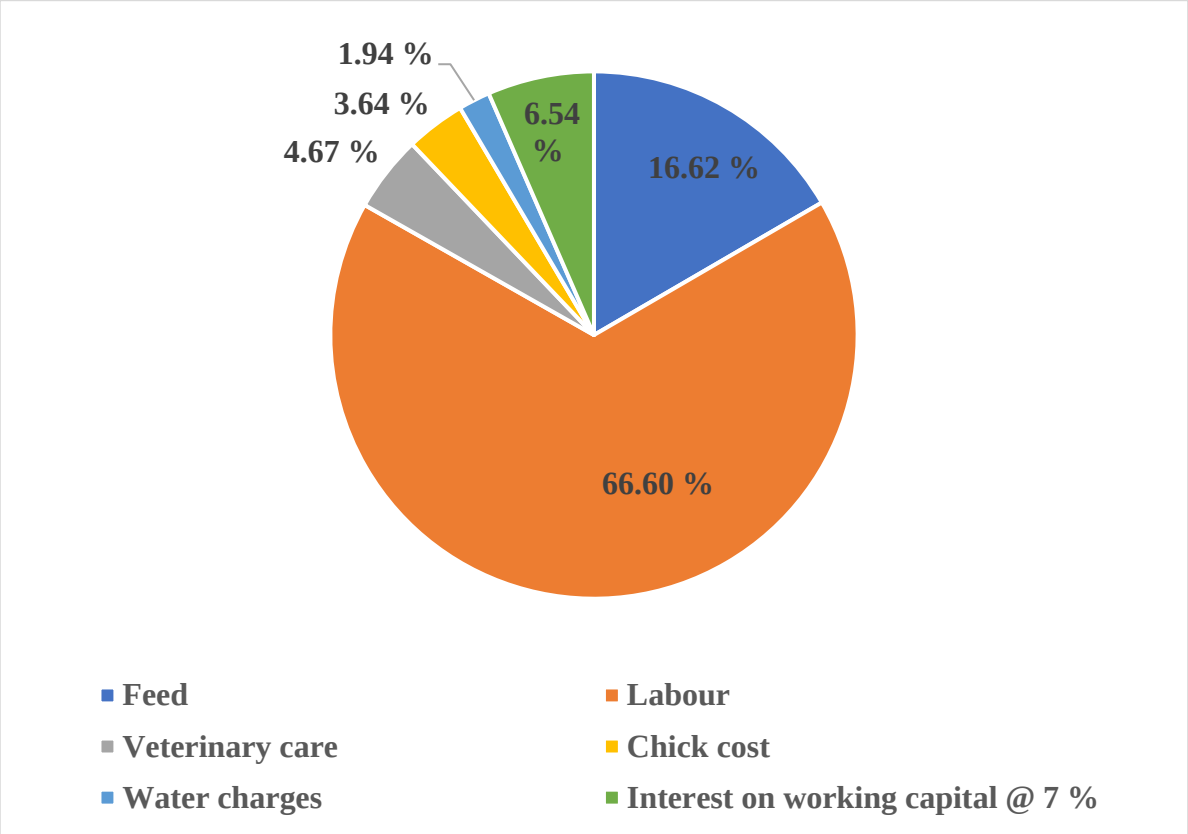

Fig. 2: Variable cost incurred in backyard poultry rearing

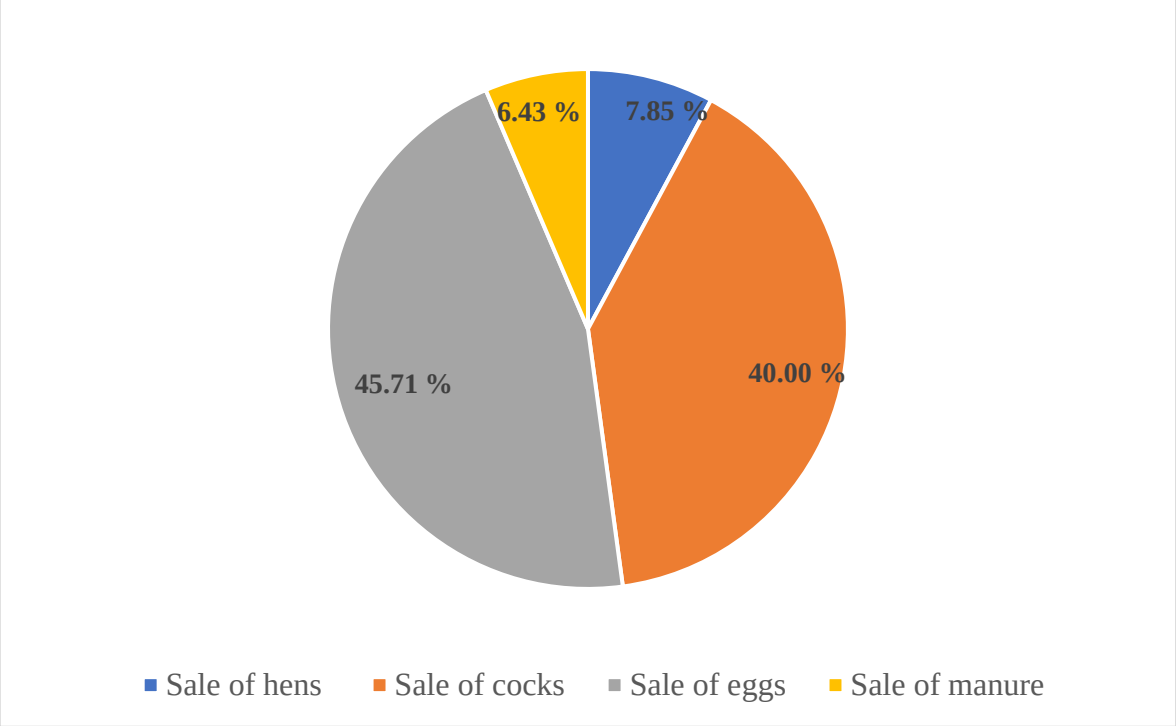

Fig. 3: Returns incurred from backyard poultry rearing

4.6 Marketing of backyard poultry birds and eggs

4.6.1 Marketing of backyard poultry birds

The marketing channels for backyard poultry birds in the study area are as follows.

Channel I: Farmer – Consumers

Channel II: Farmer – Trader – Consumers

Channel III: Farmer - Trader – Butcher - Consumer

Marketing of backyard poultry birds is presented in Table 11. Backyard poultry rearing is mainly practiced to meet the family consumption. Majority of the respondents (35 %) exclusively retained the birds for household consumption, followed by 27.50 per cent who marketed the birds directly to consumers at their doorstep, 20.00 per cent of the respondents marketed their birds through traders, and the rest 17.50 per cent respondents sold birds through middlemen *i.e.*, trader and butcher. Fig. 4 represents the share of different marketing channels for birds used by backyard poultry rearers in South Bengaluru.

Table 11: Marketing of backyard poultry birds in South Bengaluru

(n = 40)

Sl. No.	Channels	Number of farmers	Consumer price (Rs. / bird)	Marketing Cost (Rs. / bird)	Marketing Efficiency
1.	Farmer – Consumer	11 (27.50 %)	542	-	-
2.	Farmer – Trader – Consumer	8 (20.00 %)	573	20	28.65
3.	Farmer –Trader – Butcher – Consumer	7 (17.50 %)	592	32	18.50
4.	Household consumption	14 (35.00 %)	-	-	-

Note: Figures in the parenthesis indicate per cent share in total channels

In channel I, the respondents sold their birds directly to consumers, especially when the demand for chicken is high during social and religious events. In the case of Channel II, traders bought poultry birds from farmers and sold to consumers. Further, in the case of Channel III, traders purchased the birds directly from the farmers in the village, and then they sold it to butchers in weekly market. The traders bought few birds as per their requirement based on the demand by the consumers.

The marketing efficiency of backyard poultry birds was calculated in Channel II and Channel III. The marketing costs include transportation, weighment, and feeding costs, which adds up to a total of Rs. 20 and Rs. 32 on per bird basis in Channel II and Channel III, respectively. The price paid by the ultimate consumer in Channel II was Rs. 573 per live bird with a marketing efficiency of 28.65 while in Channel III, the price paid by the ultimate consumer was Rs. 592 per live bird with a marketing efficiency of 18.50. The marketing efficiency was found to be higher in Channel II as compared to Channel III because the number of middlemen were low in Channel II.

The above findings are similar to the study conducted by Khandait *et al*., (2011) in their analysis of backyard poultry rearing at Bhandara district of Maharashtra and found that majority of farmers sold the birds at their own doorstep and village market.

4.6.2 Marketing of backyard poultry eggs

Marketing of backyard poultry eggs is presented in Table 12. Majority of the respondents (50 %) utilized eggs for household consumption, followed by sale of eggs at their doorstep (20 %) through Channel I, and sale to village shopkeeper / retailer (30 %) in Channel II. Majority of the farmers rear backyard poultry to meet the nutritional requirement and family consumption with low-cost investment, while the rest sell excess eggs specially to meet the monetary benefits accrued by sale of eggs. Fig. 5 represents the share of different marketing channels for eggs used by backyard poultry rearers in South Bengaluru.

Backyard poultry market is unorganized market, marketing on the basis of net weight instead of flock selling should be encouraged. The approaches like Self-Help Groups and Farmer Producer Organization can help farmers in taking chick production unit, since there is high demand for backyard poultry chicks and rearing seems to be the best option to farmers' to fetch better prices.

Plate 1: Backyard poultry cage of Smt. Shanthamma in Gulakmale village, Bengaluru South taluk

Plate 2: Researcher collecting data from butcher Mr. Mahadesh in Tibbengowdanadoddi village, Ramanagara district

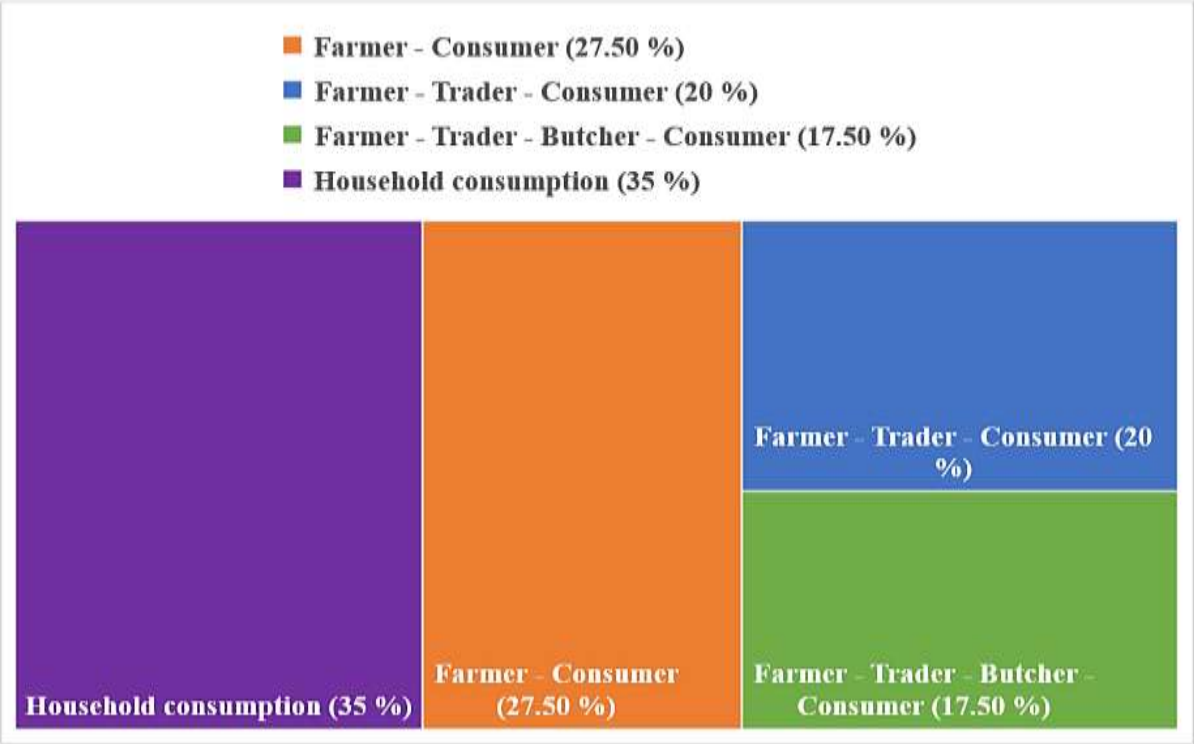

Fig. 4: Share of different marketing channels of birds by backyard poultry rearers in South Bengaluru

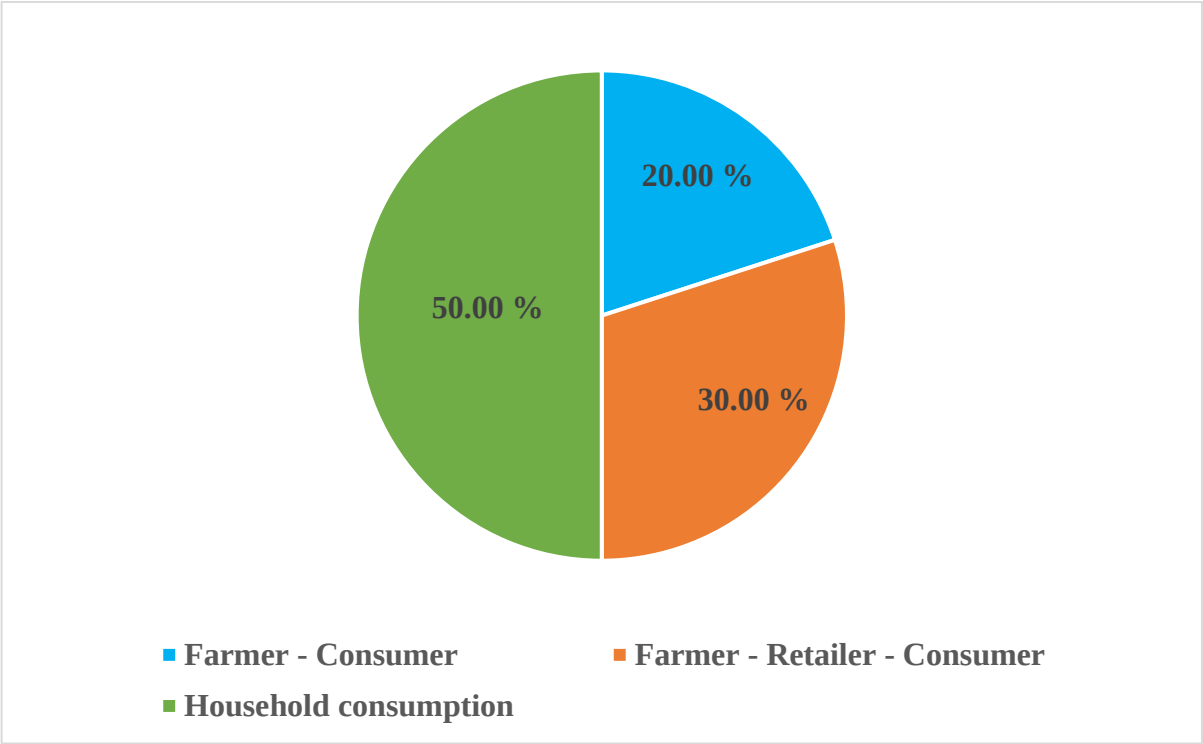

Fig. 5: Share of different marketing channels of eggs by backyard poultry rearers in South Bengaluru

Table 12: Marketing of backyard poultry eggs in South Bengaluru

(n = 40)

Sl. No.	Channels	Number of farmers	Price paid by consumers (Rs. / Egg)	Eggs sold per annum
1.	Farmer – Consumer	8 (20.00 %)	10	950
2.	Farmer – Retailer – Consumer	12 (30.00 %)	12	700
3.	Household consumption	20 (50.00 %)	-	-

Note: Figures in the parenthesis indicate per cent share in total channels

Hence, the null hypothesis that "backyard poultry birds and eggs are sold in the village itself" has been accepted.

The above findings are similar to the study conducted by Mandal *et al.,* (2006) who analyzed the marketing of backyard poultry in Bareilly district of Uttar Pradesh and found that majority of the farmers did not sell the eggs and used them for domestic consumption, while the rest sold the surplus eggs. About (89 %) of the poultry farmers marketed the eggs near the place of rearing, followed by consumer doorstep and village shopkeepers.

4.7. Women participation in backyard poultry rearing

The results regarding participation of women in backyard poultry rearing is presented in Table 13. The average flock size was found to be 28 birds. Majority of respondents (62.50 %) were women, whereas, 37.50 per cent men were involved in backyard poultry rearing.

The results indicate that women (60.00 %) took active participation in the selection of breeds. Most of the respondents were found to rear local / non-descript breeds of poultry birds and only a few backyard poultry owners reared improved backyard poultry breeds like Giriraja, Swarnadhara, etc.

The backyard poultry rearers preferred local / non-descript breeds for production of eggs and meat as these birds could be reared with low-cost investment and easily managed by the households, yielding higher economic returns.

Table 13: Participation of women in backyard poultry rearing in South Bengaluru

(n = 40)

Sl. No.	Activity	Men (in %)	Women (in %)
1.	**Selection of chicken**		
	a. Selection of breed	40.00	60.00
	b. Purchase of chicks	72.50	27.50
2.	**Management**		
	a. Supervision of chicks	12.50	87.50
	b. Feeding	10.00	90.00
	c. Watering	10.00	90.00
	d. Maintenance of temperature	17.50	82.50
	e. Bamboo basket cooping	42.50	57.50
	f. Collection of eggs	25.00	75.00
3.	**Medical care**		
	a. Vaccination	75.00	25.00
	b. Disease control measures	37.50	62.50
4.	**Marketing**		
	a. Sale of eggs	25.00	75.00
	b. Sale of birds	50.00	50.00
5.	**Record keeping**		
	a. Number of eggs sold	35.00	65.00
	b. Number of birds sold	27.50	72.50
	c. Mortality of chicks	22.50	77.50

In the case of management, aspects like supervision of chicks (87.50 %), feeding (90.00 %), watering (90.00 %), maintenance of temperature (82.50 %), bamboo basket cooping (57.50 %) and collection of eggs (75.00 %) were executed by women. Fig. 6 represents participation of men and women in backyard poultry rearing.

Women took care of the chicks to keep them safe from predators and to reduce the mortality rate of young chicks. Women had significant knowledge about the supply of daily feed (three times a day) and clean water requirement to the birds. The birds were allowed to forage for their own food depending upon the housing area in the backyard, and they fed on insects, earthworms, grains, agricultural residue, vegetables, and kitchen scraps in the backyard of the house.

Proper temperature during hatching of eggs and brooding of hens was maintained by women using sand, sawdust, wood, and husk of crops. During the night, birds were provided with proper shelter by putting in cages, sheds, or in the bamboo baskets, and women frequently collected the eggs laid by birds and stored them in proper places for further utilization in breeding, consumption, and marketing.

The above findings are similar to the study conducted by Nirmala *et al*., (2020) who assessed backyard poultry farming in West Godavari district of Andhra Pradesh. The study found that the involvement of women was more in housing, feeding, watering, healthcare, and breeding which contributed to a larger extent in increasing the household income of the family.

Further, it was found that women in comparison to men, were also involved in taking disease control measures (62.50 %) by adopting proper housing practices for separating the birds when they are infected with disease, followed by marketing activity such as sale of eggs (75.00 %), where eggs were sold to the nearest households, or nearby shops in the villages, in record keeping activities such as number of eggs sold (65.00 %), number of birds sold (72.50 %), and mortality of chicks (77.50 %).

Participation of men in backyard poultry rearing was found to be more in activities such as vaccination (75.00 %), treatment of birds was done by men due to the insufficient veterinary services in villages. Both men and women were equally involved in sale of birds, they sold the birds at their own doorstep, butchers, and at village market.

Plate 3: Researcher collecting data from backyard poultry rearers Smt. Nagaveni in Avaregere village, Ramanagara district

Plate 4: Backyard poultry shed of Mr. Chandru in Gadipalya village, Bengaluru South taluk

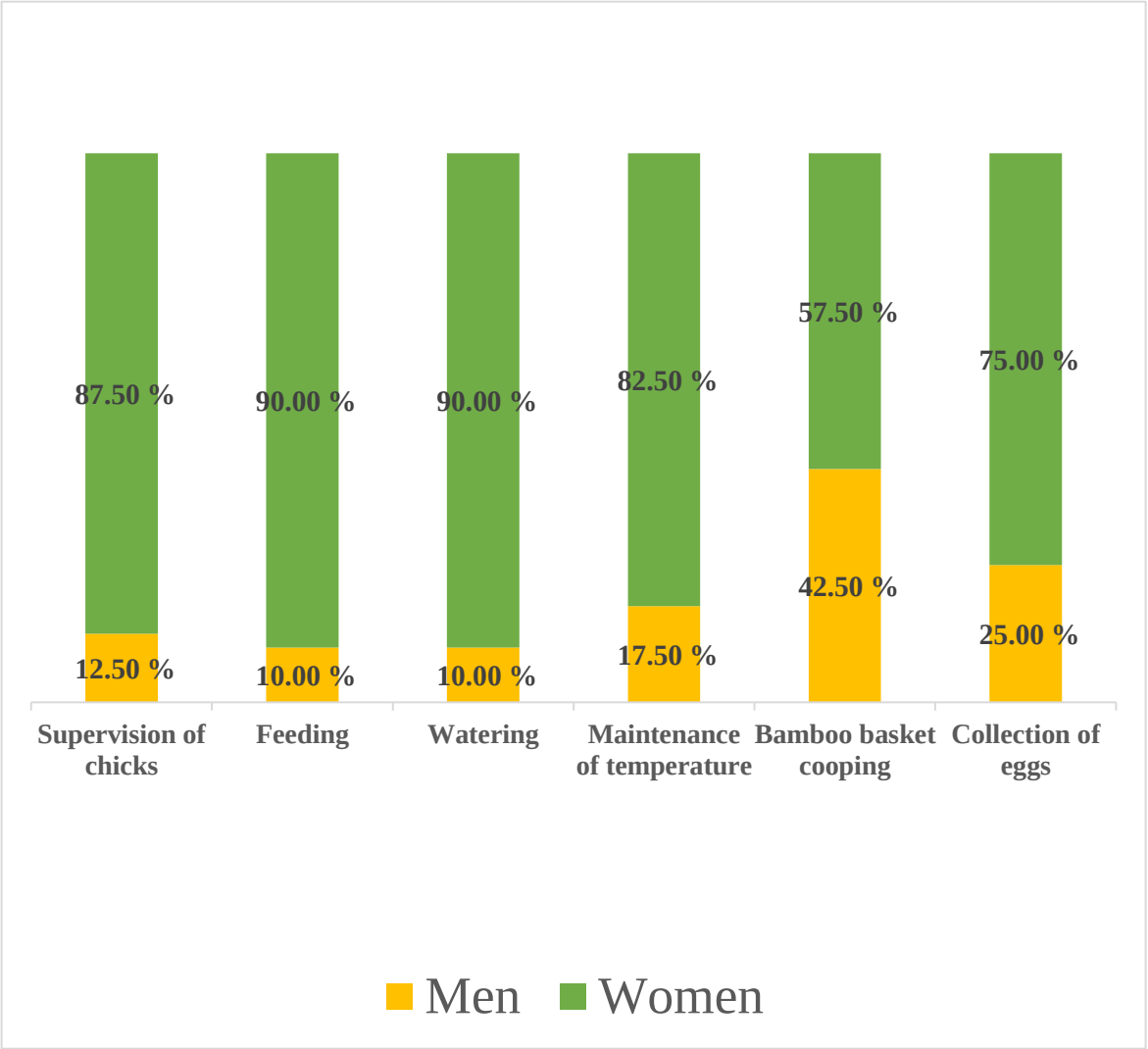

Fig. 6: Participation of men and women in backyard poultry rearing

The results of the present study prove that the null hypothesis “women have greater participation than men in backyard poultry rearing” has been accepted.

The above findings are similar to the study conducted by Chaturvedani *et al*., (2014) who examined decision making pattern followed by tribal backyard poultry rearers in Bastar district of Chhattisgarh. The study revealed that average independent women participation in poultry rearing was more in housing activities, health care activities, and feeding activities, but participated less in breeding, consumption, and marketing activities.

4.8. Consumer preference for backyard poultry meat and eggs

4.8.1 General information of consumers

The general information of consumers is presented in Table 14.

4.8.1.1 Age of consumers

Age is one of the fundamental traits of a person that is connected to maturity, physical health, work effectiveness, and degree of production.

Majority (62.22 %) of the consumers belonged to the age group of 30 to 50 years followed by age groups of up to 30 years (25.55 %), and above 50 years (12.22 %). The sample comprised of 42 men (46.66 %) and 48 women (53.33 %).

4.8.1.2 Occupation of consumers

The term "occupation" refers to one's regular or primary employment or business, particularly as a means of support which is regarded as the main source of revenue.

Majority (38.88 %) of the consumers were private sector employees followed by self-employed (24.44 %), homemakers (20.00 %), and Government employees (15.00 %).

4.8.1.3 Monthly household income of consumers

The analysis of diverse sources of household income is important to know the role of different components of income for the livelihood of a family and tends to influence the extent of purchase of backyard poultry meat and eggs

Table 14: General information of backyard poultry meat and egg consumers in Bengaluru city

(n = 90)

Sl. No.	Particulars	Numbers	Per cent
1.	**Age (years)**		
	a. Up to 30	23	25.55
	b. 30 to 50	56	62.22
	c. Above 50	11	12.22
2.	**Gender**		
	a. Men	42	46.66
	b. Women	48	53.33
3.	**Occupation**		
	a. Private sector employee	35	38.88
	b. Government employee	15	16.66
	c. Self-employed	22	24.44
	d. Homemaker	18	20.00
4.	**Monthly household income (Rs.)**		
	a. Up to Rs. 25,000	27	30.00
	b. Rs. 25,000 to Rs. 50,000	45	50.00
	c. Rs. 50,000 to 75,000	7	7.77
	d. Above Rs. 75,000	11	12.22
5.	**Frequency of meat and egg consumption**		
	a. More than once in a week	7	7.77
	b. Weekly	11	12.22
	c. Fortnightly	33	36.66
	d. More than once per month	26	28.88
	e. Monthly	13	14.44

Majority (50 %) of the consumers had monthly household income ranging from Rs. 25,000 to Rs. 50,000, followed by 30.00 per cent of them with monthly household income ranging up to Rs. 25,000, 12.22 per cent of the consumers had monthly household income of above Rs. 75,000, and about seven per cent of them with monthly household income from Rs. 50,000 to Rs. 75,000.

4.8.1.4 Frequency of meat and egg consumption

Frequency is influenced by consumer attitudes and behaviour about eating habits and diet identities that include the consumption of meat and eggs.

With regard to frequency of meat and egg consumption, it was found that majority (36.66 %) of the consumers consumed fortnightly, followed by those (28.88 %) who consumed more than once per month, monthly (14.44 %), weekly (12.22 %), and more than once in a week (7.77 %).

4.8.2 Consumer preference for backyard poultry meat

Consumer preference for backyard poultry meat is represented in table 15. It was analyzed using logit function. Consumers preferred backyard poultry for its nutritional value and taste. It was observed that a unit change in age resulted in an increase in the consumption by 0.75 kg, which was found to be significant at one per cent level, whereas, a unit change in frequency resulted the increase in consumption by 1.2 kg, which is significant at ten per cent level.

Consumers from the age group 30 to 50 years highly preferred backyard poultry meat because of health consciousness and awareness owing to backyard poultry birds being free from antibiotic growth promoters and additives. The backyard poultry rearers do not use antibiotic growth promoters such as antibiotics, probiotics, prebiotics, exogenous enzymes, antioxidants, *etc*., and additives like arsenic, which are very common in commercial poultry rearing. Backyard poultry meat is free from all the ill-effects, whereas due to low life cycle of commercial birds, the feed that fattens the chicken results in unhealthy fat being passed to the consumers.

Backyard poultry meat is tastier compared to broiler meat because of the varied diet consumption of the birds. Also, there is lower cooking losses in backyard poultry meat as it has better water holding capacity. As a result of all these factors, the consumers prefer consumption of backyard poultry meat frequently irrespective of its high price.

Table 15: Consumer preference for backyard poultry meat in Bengaluru city

(n =90)

	Co-efficient	Std. Error	Z	P - value
Constant	32.3435	5.356693	3.223	0.0013***
Age	0.753684	0.166923	4.515163	0.0024***
Gender	0.766265	0.773297	0.990907	0.321731
Frequency	1.281327	0.7461	1.717367	0.085912*
Quantity per purchase	0.521047	1.596342	0.326401	0.744121
Experience in purchasing	0.263445	0.166096	1.586102	0.112716
Likelihood ratio test	76.4863			
Schwarz criterion	73.09245			
Akaike criterion	58.0936			
Number of cases 'correctly predicted'	84.40 %			

Note: ***Significant at 1 per cent level

*Significant at 10 per cent level

The other factors like gender, quantity per purchase, and experience in purchasing were not significant because people irrespective of gender preferred to have backyard poultry meat, while quantity of purchase and purchase experience remains same irrespective of unit change in frequency.

The model has higher likelihood value (76.48) and Schwarz criterion value (73.09) indicates that model is a good fit. The number of cases correctly predicted in the model is 84.40 per cent which indicates that majority of respondents prefer backyard poultry meat for its nutritional value and taste.

The results of the present study are in tune with Augustine and Shukla (2017) who assessed the consumer preferences and market potential for the backyard poultry rearing system in Kumi district of Uganda. They also indicated that poultry traders mainly dealt with

indigenous chicken breeds as the customers preferred it due to taste and less chemical residues.

4.8.3 Consumer preference for backyard poultry eggs

Consumer preference for backyard poultry eggs is represented in table 16. Most of the consumers were found to prefer backyard poultry egg for its nutritive value (46.67 %), taste (33.33 %), colour (11.11 %), and price (8.89 %).

Table 16: Consumer preference for backyard poultry eggs in Bengaluru city

(n = 40)

Sl. No.	Particulars	Number	Per cent
1.	**Factors influencing purchase of backyard poultry eggs**		
	a. Colour	10	11.11
	b. Nutritive value	42	46.67
	c. Taste	30	33.33
	d. Price	8	8.89
2.	**Place of purchase of backyard poultry eggs**		
	a. Butcher shop	17	18.89
	b. Meat shops	27	30.00
	c. Supermarkets	38	42.22
	d. Online	8	8.89

The backyard poultry eggs are rich in vitamin E, beta carotene, omega-3 fatty acids when compared to commercially produced eggs. The good taste is because of richly coloured yolk and dietary pattern of backyard poultry birds. Further it is believed that brown coloured egg shell is harder when compared to white coloured egg shell.

Majority of the consumers bought backyard poultry egg from nearby supermarkets (42.22 %), followed by meat shop (30.00 %), butcher shop (18.89 %), and online (8.89 %). In

supermarkets, eggs are placed under refrigerated condition with proper packaging and labelling, where eggs are clean and crack-free. Consumers purchased eggs on a weekly basis from meat shops and butchers, based on their diet. Consumers purchased eggs through online platforms such as licious, big basket, etc., because of convenience.

Hence, the null hypothesis that "consumers prefer meat and eggs of backyard poultry compared to broiler" has been accepted.

The above findings are similar to the study conducted by Raha (2000) who analysed the poultry industry in Bangladesh and found that indigenous chicken was better than broilers in terms of taste and quality of meat. Indigenous chicken were sold at much higher prices than the broiler. The consumers preferred brown-shelled eggs to white-shelled eggs owing to nutrition and the prices of brown-shelled eggs were higher than that of white-shelled eggs in the market.

4.9 Constraints in backyard poultry rearing

4.9.1 Production constraints in backyard poultry rearing

The production constraints faced by backyard poultry rearers in the study area are presented in Table 17.

As indicated by the Garrett's ranking technique, incidence of diseases was the major constraint faced by backyard poultry rearers which results in huge loss. Diseases like Ranikhet, fowl pox, diarrhoea, respiratory problem, fever, dullness, *etc*., was the most common constraint affecting backyard poultry birds in the study area. High mortality of chicks was the second major production constraint in backyard poultry rearing because of genetical defect and nutritional cause.

The third production constraint was injury and death of birds due to fighting with one another, pecking during oviposition, cannibalistic behavior, and sometimes birds meet with accidents which cause deformity of legs, crooked toes, etc. The fourth production constraint was inadequate space as poultry birds litter houses and the surrounding premises. The fifth production constraint was risk of predators due to the attack of cats, dogs, snakes, *etc*., as backyard birds roam freely outside the cages / coop for forage and scavenging.

Table 17: Production constraints in backyard poultry rearing in South Bengaluru

(n = 40)

Sl. No.	Particulars	Mean Garrett's Score	Rank
1.	Incidence of diseases	72.12	I
2.	High mortality rate of chicks	65.27	II
3.	Injury and death	64.80	III
4.	Inadequate space	52.55	IV
5.	Risk of predators	51.90	V
6.	Theft	49.55	VI
7.	Inadequate availability of veterinary services	42.05	VII
8.	Inadequate availability of feed	30.20	VIII
9.	Inadequate availability of water	21.70	IX

The other production constraints faced by farmers in the villages were theft, inadequate availability of veterinary services, inadequate availability of feed, and inadequate availability of water.

The above findings are similar to the study conducted by Mandal *et al.*, (2006) who analyzed the backyard poultry farming in Bareilly district of Uttar Pradesh. The study revealed that mortality due to high incidence of disease was the major constraint followed by lack of suitable germplasm, attack of predators, mortality during hatching, lack of financial support, and high cost of inputs/chicks as the problems faced by farmers.

4.9.2 Marketing constraints in backyard poultry rearing

The marketing constraints faced by the backyard poultry rearers in the study area are presented in Table 18. Price fluctuation was the major marketing constraint in the study area. Though the products of backyard poultry are in great demand, due to the unorganized market

rearers are unable to get premium price for their products. The farmers informed that prices varied widely within the village itself, and sometimes traders and butchers negotiated the prices of birds based on visual inspection rather than weighing the bird, and quoted low prices.

Table 18: Marketing constraints in backyard poultry rearing in South Bengaluru

(n = 40)

Sl. No.	Particulars	Mean Garrett's Score	Rank
1.	Price fluctuation	54.75	I
2.	Inadequate market information	49.05	II
3.	Inadequate availability of transportation facilities	46.20	III

The second marketing constraint faced by the farmers was lack of market information. Most of the backyard poultry rearers were unaware about the information of weekly markets for birds and hence, sold their birds in local markets such as Bannigeri, Kaggalipura, etc. The other marketing constraint was inadequate availability of transportation facilities in the study area due to lack of proper roads.

Hence, the null hypothesis that "Incidence of diseases is the is the major production constraint and price fluctuation is the major marketing constraint in backyard poultry rearing" has been accepted.

The above findings are similar to the study conducted by Obike *et al*., (2017) in their investigation on risk management and determinants of farm output among small scale poultry farmers in Ekiti State, Nigeria. The results showed that production, financial, marketing, technological and human risks were the major sources of risks encountered by the poultry farmers which are in tune with the results of present study.

SUMMARY

V SUMMARY

Agriculture sector is the backbone of the Indian economy. About 61 per cent of the population in the country rely on agriculture and related activities for their main source of income. However, the agriculture sector's contribution to total Gross Value Added (GVA) is 20.2 per cent, the services sector accounts for 53.89 per cent and the industry sector makes up 25.92 per cent of the GVA in 2020–2021. The Indian agro-industry is divided into a number of sub-sectors, ranging from fisheries, meat, poultry, dairy, processed, and frozen food. The livestock has emerged as one of the fastest-growing sectors and it undoubtedly aid in the fight against poverty in a developing nation like India, where the majority of rural poor people depend on livestock for their daily subsistence.

Poultry is an important sub-sector of livestock in India and has played a crucial role in both creating jobs and significantly boosting the country's Gross Domestic Product (GDP). Poultry development has taken a quantum leap in last three decades due to the progression of processing technology, increases in urbanisation and affluence, and advancements in the market supply chain. In India, there are primarily two sub-sectors of the poultry industry: one has a highly structured commercial sector that accounts for about 80 per cent of the entire market share, and the other has an unorganised sector that accounts for about 20 per cent of the total market share. Backyard poultry, a part of the unorganised sector that contributes significantly for improving the socio-economic and dietary circumstances of the poor.

In backyard poultry farming, small numbers of native chickens are reared with or without inputs under the free-range scavenging conditions, natural hatching, low bird output, regional marketing, and lack of medical care. In recent years, backyard poultry has gained recognition as a powerful strategy for reducing poverty, though the practise of raising chickens in backyards has been followed in villages for ages. However, the modern scientific backyard poultry farming had begun recently with the start of research into the development of high-performing chickens that are appropriate for backyard poultry farming.

The University of Agricultural Sciences, Bangalore was a pioneer in creating a high performing bird that would thrive in rural backyards. A paradigm change in the nation's poultry breeding activities toward rural poultry has been brought about by the development of the Giriraja bird.

As per the 20th Livestock Census, the total population of backyard poultry has increased from 217.49 million to 317.07 million by the rate 45.79 per cent. More than 50 per cent of India's backyard poultry population are found in five states; West Bengal, Assam, Andhra Pradesh, Maharashtra and Tamil Nadu. In Karnataka, total population of backyard poultry was 10.98 million comprising of 2.56 million cocks, 4.27 million hens and 4.14 million chickens below five months.

The South Bengaluru was purposively selected for the study. A good number of farmers are practising backyard poultry rearing along this transect. Bengaluru South taluk of Bengaluru Urban district and Ramanagara taluk of Ramanagara district were purposively selected for the study. There are not enough studies on backyard poultry rearing in South Bengaluru.

The present study was an attempt to analyze the economic evaluation of backyard poultry enterprise in South Bengaluru with the following objectives.

1. To estimate the profitability of backyard poultry enterprise

2. To analyze the marketing of backyard poultry birds and eggs

3. To assess the women participation in backyard poultry rearing

4. To analyze the consumer preference for backyard poultry birds and eggs

5. To examine the constraints in production and marketing of backyard poultry birds and eggs

5.1 Methodology

For the present study, Vidhana Soudha, which is in the middle of Bengaluru city, was purposefully chosen as the reference point for the Southern Bengaluru.

The villages in Bengaluru Urban and Ramanagara district were randomly selected for the study. Purposive sampling method was adopted for selection of 40 backyard poultry farmers. In addition, data was elicited from 90 consumers in Bengaluru city and five butchers and five traders in the study area.

The primary data for the study were obtained from the sample farmers through personal interview method with the help of a pre-tested structured schedule. The collected data pertains to the agricultural year 2021-22. As most of the respondents did not maintain the

records of expenditure and receipts of farm enterprises, the data collected were based on the memory of the respondents.

The data elicited related to (a) profitability of backyard poultry rearing; (b) marketing in backyard poultry rearing; (c) participation of women in backyard poultry rearing; (d) consumer preferences for backyard poultry birds and eggs; and (e) production and marketing constraints in backyard poultry rearing.

5.1.1 Analytical techniques

To analyse the objectives of the study, cost and return analysis, Shepherd's approach, descriptive statistics such as averages, percentages, etc., logit model, and Garrett's ranking technique were used.

5.1.2 Major findings of the study

The major findings of the study were as follows.

- Majority (55 %) of the backyard poultry rearers belonged to the age group of above 50 years followed by age group of 30 to 50 years (25 %) and age group of 20 to 30 years (20 %).
- With regard to the education level of the backyard poultry rearers majority (55 %) of the rearers were illiterates followed by those who had studied up to primary school (27.50 %), with another (17.50 %) of them with education upto SSLC level.
- Majority (85 %) of the families of the backyard poultry rearers were nuclear while the rest (15 %) had joint families. The average family size was five consisting of two men, two women and one child.
- Majority (80 %) of the sample farmers practised backyard poultry rearing as the subsidiary occupation, while for the rest (20 %), it was a main occupation.
- The average farm size of backyard poultry rearers was 2.1 acres. About 57 per cent of the farm was dryland followed by irrigated land (31.90 %) and garden land (10.95 %).
- The average size of the backyard flock maintained by farmers was 28, while that of sheep, goat, and cattle enterprises was six, five, and three, respectively
- The composition of backyard poultry flock was dominated by hens (64.29 %), followed by cocks (21.43 %), pullets (10.71 %) and cockerels (3.57 %).

- The total cost incurred per annum for rearing a flock size of birds was estimated to be Rs. 8,711.02, out of which, fixed cost and variable costs accounted for 5.36 per cent (Rs. 467.17) and 94.64 per cent (Rs.8,243.85), respectively.
- Among the variable costs, labour was the major cost accounting for 66.60 per cent of the total variable cost followed by feed (16.62 %), veterinary care (4.67 %), chick cost (3.64 %), and water (1.94 %).
- Among the fixed costs, depreciation of cages was the major cost accounting for 68.66 per cent of total fixed cost followed by depreciation on equipment (20.63 %) and interest on fixed capital constituted (10.71 %).
- The returns realized from backyard poultry rearing included hen and cock, sale of eggs and sale of manure which accounted for 7.85 per cent, 40.00 per cent, 45.71 per cent and 6.43 per cent of the gross returns, respectively.
- The annual gross returns obtained from rearing a flock size of 28 birds was Rs. 21,000 resulting in net returns of Rs. 12,288.98 and net returns per bird was estimated to be Rs. 438.89.
- In the study area, three channels were prevalent for marketing of backyard poultry birds, viz., Channel I: Farmer – Consumer, Channel II: Farmer – Trader – Consumer and Channel III: Farmer – Trader – Butcher – Consumer.
- Majority of the respondents (35.00 %) exclusively retained the birds for household consumption, followed by (27.50 %) marketed the birds directly to consumers at doorstep, another (20.00 %) respondents marketed the birds through traders, and rest 17.50 per cent respondents sold birds through middleman *i.e.*, trader and butcher.
- The price paid by the ultimate consumer in Channel II was Rs. 575 per live bird with a marketing efficiency of 28.75 while in Channel III, the price paid by the ultimate consumer was Rs. 600 per live bird with a marketing efficiency of 18.75. The marketing efficiency was found to be higher in Channel II as compared to Channel III because the number of middlemen were low in Channel II.
- In the study area, two channels were prevalent for marketing of backyard poultry eggs, viz., Channel I: Farmer – Consumer, Channel II: Farmer – Retailer – Consumer
- Majority of the respondents (50 %) utilized eggs for household consumption, followed by sale of eggs at their doorstep (20 %) through Channel I, and sale to village shopkeeper / retailer (30 %) in Channel II.
- Majority of respondents (62.50 %) were women, whereas, 37.50 % men were involved in backyard poultry rearing. The results indicate that women took active participation

in the selection of breeds, supervision of chicks, feeding, watering, maintenance of temperature, bamboo basket cooping, collection of eggs, disease control measures, sale of eggs. In record keeping activities such as number of eggs sold, number of birds sold, and mortality of chicks, in comparison to men.

- Majority (62.22 %) of the consumers belonged to the age group of 30 to 50 years followed by age groups of up to 30 years (25.55 %), and above 50 years (12.22 %). The sample comprised of 42 men (46.66 %) and 48 women (53.33 %).
- Majority (38.88 %) of the consumers were private sector employees followed by self-employed (24.44 %), homemakers (20.00 %), and Government employees (15.00 %).
- Majority (50.00 %) of the consumers had monthly household income ranging from Rs. 25,000 to Rs. 50,000 followed by 30.00 per cent of them with monthly household income ranging up to Rs. 25,000 and another 12.22 per cent of the consumers had monthly household income of above Rs. 75,000 and about seven per cent of them with monthly household income from Rs. 50,000 to Rs. 75,000.
- With regard to frequency of meat and egg consumption, it was found that majority (36.66 %) of the consumers consumed fortnightly followed by those (28.88 %) who consumed more than once per month, monthly (14.44 %), weekly (12.22 %), and more than once in a week (7.77 %) per cent.
- It was noticed that, a unit change in age resulted an increase in the consumption by 0.75 kg, which was found to be significant at one per cent level, while a unit change in frequency resulted the increase in consumption by 1.2 kg, which is significant at ten per cent level.
- Most of the respondents were found to prefer backyard poultry egg for its nutritive value (46.67 %), taste (33.33 %), colour (11.11 %), and price (8.89 %)
- Majority of the consumers bought backyard poultry egg from nearby supermarkets (42.22 %), followed by meat shop (30.00 %), butcher shop (18.89 %), and online (8.89 %)
- Among the production constraints, incidence of diseases was the major constraint faced by backyard poultry rearers. High mortality of chicks was the second major production constraint followed by injury and death, inadequate space, risk of predators, theft, inadequate availability of veterinary services, inadequate availability of feed, and inadequate availability of water.
- Among the marketing constraints, price fluctuation was the first major marketing constraint in the study area. Inadequate market information was the second major

marketing constraint followed by inadequate availability of transportation facilities in the study area.

Policy implications

- Backyard poultry enterprises are best suited to be adopted by farmers on large scale in South Bengaluru, as it is profitable and serves as better livelihood options against low income from agricultural crops.

- Since, backyard poultry is found to be financially viable in South Bengaluru, because birds can be initially reared with a low-cost investment, easily managed by households along with their routine work and can bring higher economic returns.

- Backyard poultry is currently an unorganized market. Community-based approaches like Self Help Groups (SHGs) and Farmer Producer Organizations (FPOs) can provide the right platform to market the birds.

- As indicated by the farmers, free supply of backyard poultry chicks and subsidies by the Government organization along with proper arrangement of training facility to rearers would enhance the returns to farmers.

Plate 5: Researcher collecting data from backyard poultry rearer Mr. Tyagaraj, Bannikuppe village, Ramanagara district

Plate 6: Backyard poultry flock of Mr. Vijay in Gollarapalya village, Ramanagara district

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