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Status of animal husbandry mechanization in selected agro climatic zones of Chhattisgarh

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Abstract

Animal husbandry mechanization is crucial for improving productivity, efficiency, and animal welfare. However, it faces challenges such as high costs of machinery and limited financial resources for small-scale farmers in the Chhattisgarh Plains and Bastar Plateau. A comprehensive survey was conducted across Raipur and Bastar districts to assess the status of animal husbandry practices, specifically in the dairy and poultry sectors. A survey of 240 farmers (120 dairy and 120 poultry) across representative villages showed a heavy reliance on manual methods in both sectors. In dairy, farmers use equipment like automatic waterers, cow mats, and manure scrapers, though advanced tools such as bulk milk coolers, feed mixers, and calf feeders are largely absent. Poultry farmers have adopted automated systems for feeding, drinking, ventilation, and lighting, though equipment like egg incubators, hatchers, and brooders are less commonly used. Mechanization is more prevalent in Raipur than Bastar, but both regions show a significant need for advanced tools. For dairy, automated milking machines, feed mixers, and cooling systems are recommended, while the poultry sector would benefit from automated feeders, modern lighting solutions, and egg collectors. Mechanization not only improves productivity but also boosts profitability. Slightly mechanized dairy farms generate ₹7,625 per animal monthly, compared to ₹6,675 in traditional setups. Similarly, mechanized poultry farms yield ₹24,842 per 1,000 chicks yearly, compared to ₹22,608 on traditional farms. These findings underscore the importance of adopting advanced equipment to enhance productivity and economic returns.

Keywords: Animal husbandry, Chhattisgarh plains, bastar plateau, mechanization, poultry, dairy, Raipur, bastar, equipment, automated and productivity

1. Introduction

The sector of agriculture known as “animal husbandry” is dedicated to the production of animals for meat, milk, fiber, and other purposes. It include managing the animals, selective breeding, and everyday care. Animal husbandry mechanization refers to the adoption and use of machinery, equipment, and technology to automate or streamline various tasks and processes involved in animal husbandry practices. This mechanization aims to improve efficiency, productivity, and profitability in livestock farming while reducing labour requirements and associated costs.

Animal husbandry mechanization is essential for modern livestock farming due to its significant benefits across various aspects of production and management. It enhances productivity by allowing farmers to handle larger herds more efficiently and with less labour.

Animal husbandry in Chhattisgarh faces challenges such as inadequate infrastructure, lack of access to veterinary services, limited awareness about modern farming practices, market fluctuations and low level of mechanization. Climate change and natural calamities can also affect animal husbandry activities. The Chhattisgarh government has various schemes and programs to promote animal husbandry (subsidies) and support the livelihoods of rural communities.

It's important to note that the extent of mechanization in animal husbandry can vary depending on factors such as the scale of operations, availability of resources, technological adoption, and government support. While there may be some level of mechanization present in certain aspects of animal husbandry in Chhattisgarh, the sector may still largely rely on traditional methods and manual labour, especially in small-scale and backyard farming systems.

Efforts to promote mechanization and technological interventions in animal husbandry are ongoing, aiming to improve productivity, livelihoods, and sustainability in the sector. This paper focuses on studying the level of mechanization in animal husbandry over selected agro climatic zones of Chhattisgarh. By finding out the gap status of animal husbandry mechanization in the Chhattisgarh Plains and Bastar Plateau, searching the data of existing gadgets, machinery, etc. currently used in the dairy and poultry sectors by farmers and identify the mechanization required in the dairy and poultry sectors.

2. Materials and Methods

The mechanization of animal husbandry involves the integration of advanced machinery and technology to enhance the efficiency, productivity, and welfare of livestock farming. The materials and methods employed to find out the status of mechanization used in animal husbandry over selected agro-climatic zones, detailing the general information, types of equipment used, input and output economic details, their mechanization, and the technological innovations implemented.

2.1 Sampling and survey methods

The present study requires the selection of area, selection of respondents, collection of data and analytical techniques. The study was carried out in 2 out of 3 agro-climatic zones of Chhattisgarh namely Chhattisgarh Plains and Bastar Plateaus. A three-stage stratified random sampling method was used after selection of district to select a sample of farmers. In the first stage, blocks were randomly selected. In the second stage, villages were randomly selected from within each

block. In the third stage, farmers were randomly selected from within each village.

2.1.1 Selection of district

The survey was conducted in selected agro-climatic zones (Chhattisgarh Plain and Baster Plateau) within selected districts (Raipur District and Bastar District) of Chhattisgarh.

2.1.2 Selection of block: Two blocks from each selected district were randomly selected. In Chhattisgarh plains agro climatic zone Dharsiwa and Arang block were selected from Raipur district. From Bastar plateau, Bastar district Bastar and Jagdalpur blocks were selected randomly for case study.

2.1.3 Selection of village

For this particular case study 5 villages were selected randomly from each block. In Raipur district, from Dharsiwa block Pirda, Kachna, Dharampura, Devepuri, Saddu and from Arang block, Mandirhasaud, Nakta, Baktara, Darba and Bahankari villages were selected in Chhattisgarh plains zone for case study. In Bastar plateau, from Bastar district, Bakawand, Bhanpuri, Vishrampur, Bakel and Devda villages from Bastar block and from Jagdalpur block, Titargaon, Niyandar, Pandripani, Sirhaguda and Bhadisaon villages were selected for case study.

2.1.4 Selection of respondents

Twelve farmers from each of the selected village will be considered to collect the required information in which six of them are dairy farmers and six of them are poultry farmers. In all, a total 240 farmers were selected from 20 villages for interview in the present study.

Table 1: Sample size for collection of data

S. No.	Agro-climatic zones in C.G.	District	Name of blocks	Name of villages	No. of farmers	Total no. of respondents
1	Chhattisgarh Plains	Raipur	Dharsiwa	Pirda Kachna Dharampura Nokti Devepuri Saddu	12 from each village	240
			Arang	Mandirhasaud Nakta Baktara Darba Bahankari	12 from each village	
2	Baster Plateau	Bastar	Bastar	Bakawand Bhanpuri Vishrampur Bakel Devda	12 from each village	
			Jagdalpur	Titargaon Niyandar Pandripani Sirhaguda Bhadisaon	12 from each village	

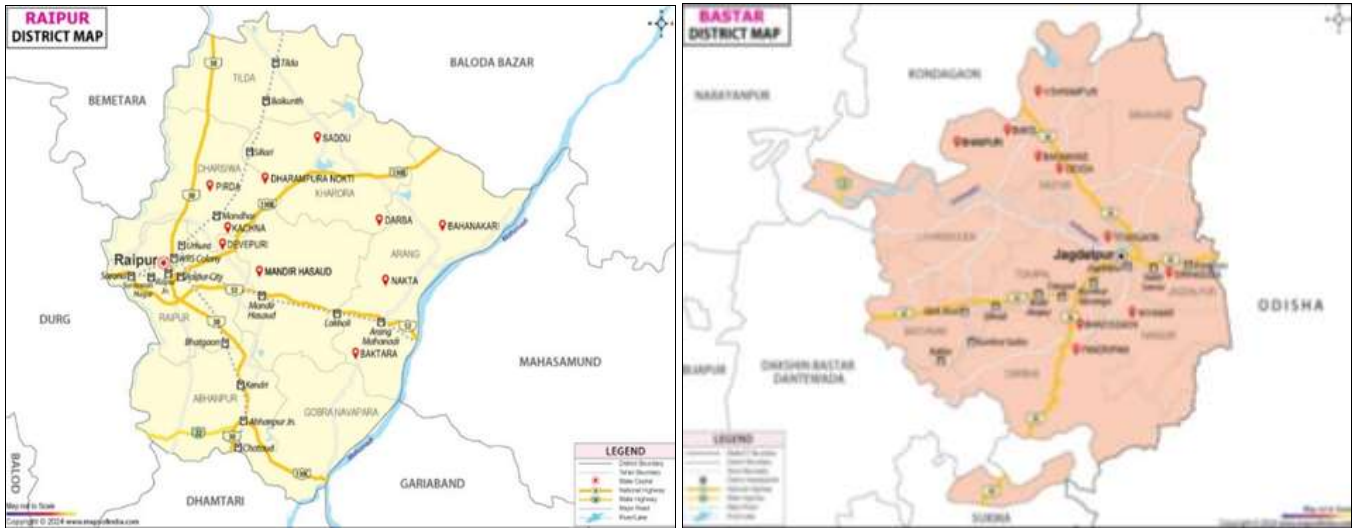


Fig 1: Selected villages of Raipur district and Bastar district

2.2 Method of enquiry

2.2.1 Development of proforma

The proforma was divided in four parts. In the first part, the general information of the farmer is known. In the general information we came to know the farmers age, educational qualification, and farmer’s primary and secondary occupation. We also came to know about the farmer’s total family members and family members involved in work. In the second part of the proforma, all the farm implements or equipment used by the farmer and its detailed specification is collected and annual use of each implement is asked to know which implements are less used and which are frequently used. In the third part of the proforma, economic status of the farm is collected in which we came to know about production cost, revenue cost and profitability. In the last part of the proforma, the suggestion where taken by the farmers about their requirements and equipment essential for them.

2.2.2 Selection of interview schedule

The survey was used to conduct from 5:30 am in the morning

according to feasibility of the farmers. Following village selection, the Krishi Mitra of each village gathered the village’s details. The chosen farmer’s general data is gathered.

2.3 Method of data collection

2.3.1 Primary data

The data were collected through personal interview of the farmers on the pre- tested proforma. Enquiry approach was used to gather data from a subset of farmers who fit into various categories. The farmer’s equivalents were interviewed in order to get information on home activities. Based on the farmer’s verbal interviews, the several animal husbandry operations, such as field work, feeding, watering, cleaning, maintenance, and transportation, among others, through mechanization, were documented for each farm. Result were noted for each of the chosen farmers with had their time and labour requirements for field activities along with other basic information were collected individually from all the selected farmers.





Fig 3: Interview of farmers with developed proforma

2.3.2 Secondary data

The secondary data related to Chhattisgarh state is collected from the Commissioner, Land Records, Directorate of Animal Husbandry, Statistical handbook of Chhattisgarh.

2.3.3 Data processing

The data that was gathered was processed using standard practices that the researchers recommended. Initially, the data pertaining to the mechanization of animal husbandry was categorized differently for each village's respondents. The values thus discovered were grouped separately for every farmer category in a tabular format.

2.3.4 Analysis of data

The frequency, percentage and mean were calculated for precise and meaning analysis and interpreting of the data collected. Data were analyzed for the most part by using graph and tabular form as for its inherent quality in portraying the true picture of animal husbandry mechanization in selected agro climatic zones of Chhattisgarh.

3. Results and Discussions

A comprehensive analysis of the current mechanization status of dairy and poultry farms in selected regions of Chhattisgarh, focusing on key aspects such as the number of farms, production levels, availability of equipment's, economic data, and mechanization required.

3.1 General Characteristics of Sample Farmers

This section delves into the demographic profiles, age, educational backgrounds, experience levels, occupation and labour distribution of the farmers engaged in these sectors. Analyzing these characteristics helps to identify the human factor that influence farming practices, productivity, and economic outcomes.

3.1.1 Age of respondents of dairy farms

In the Raipur district, the maximum age of respondents 51.6% are age between 40-50, while 23.3% are age between 50-60, 15% are age between 30-40 and the minimum 5% are age between 20-30 and 60-70, and in Bastar district, the maximum age of respondents 46.66% are age between 40-50, while 28.33% are age between 50-60, 20% are age between 30-40, 3.33% are age between 20-30 and the minimum 5% are age between 60-70.

3.1.2 Education of respondents of dairy farms

In the Raipur district, the maximum education of respondents 56.6% have bachelor degree or diploma, while 40% are high

school passed and 3.33% have only studied 10th grade or below, and in Bastar district, the maximum education of respondents 51.66% have bachelor degree or diploma, while 45% are high school passed and 3.33% have only studied 10th grade or below.

3.1.3 Experience level of dairy farmers

In the Raipur district, the maximum respondents 48.33% have experience of 07-10 years, while 35% have experience of 04-06 years, 11.6% have experience of 01-03 years, and the minimum 5% have experience of above 10 years, and in Bastar district, the maximum respondents 46.66% have experience of 04-06 years, while 30% have experience of 07-10 years, 21.66% have experience of 01-03 years, and the minimum 1.66% have experience of above 10 years.

3.1.4 Scale of business of dairy farms

In Raipur, the smallest farms (below 5 cows) represent 6.6%, while in Bastar, they are more prevalent at 18.33%. Medium-sized farms (5-10 cows) are common in both districts, with Raipur at 35% and Bastar slightly higher at 40%. In the 10-15 cows category, Raipur has 31.6%, more than Bastar's 25%. Farms with 15-20 cows are fairly similar in both districts, at 15% for Raipur and 16.66% for Bastar. However, farms with 20-25 cows are seen only in Raipur at 11.6%, while Bastar has none.

3.1.5 Occupation status of dairy farmers

In Raipur district, the maximum 85% of respondents are full time dairy farmer and the rest 15% of respondents are part time dairy farmer, and in Bastar district, the maximum 88.33% of respondents are full time dairy farmer and the rest 11.66% of respondents are part time dairy farmer.

3.1.6 Labour distribution for dairy farms

In Raipur district, the 50% of respondents hired labour for the work at dairy farm and 50% of respondents use family labour for work, and in Bastar district, the 38.33% of respondents hired labour for the work at dairy farm and 61.66% of respondents use family labour for work.

3.1.7 Age of respondents of poultry farms

In the Raipur district, the maximum age of respondents 46.33% are age between 40-50, while 21.66% are age between 50-60, 18.33% are age between 30-40 and the minimum 13.33% are age between 20-30, and in Bastar district, the maximum age of respondents 38.33% are age between 30-40, while 33.33% are age between 40-50, 18.33% are age between 50-60 and the minimum 5% are age between 20-30.

3.1.8 Education of respondents of poultry farms

In Fig. 4.8, in the Raipur district, the maximum education of respondents 73.33% have bachelor degree or diploma, while 20% are high school passed and 6.66% have only studied 10th grade or below, and in Bastar district, the maximum education of respondents 71.66% have bachelor degree or diploma, while 23.33% are high school passed and 5% have only studied 10th grade or below.

3.1.9 Experience level of poultry farmers

In the Raipur district, the maximum respondents 50% have experience of 07-10 years, while 28.33% have experience of 04-06 years, 20% have experience of 01-03 years, and the minimum 1.66% have experience of above 10 years, and in Bastar district, the maximum respondents 51.66% have experience of 04-06 years, while 25% have experience of 07-10 years, 16.66% have experience of 01-03 years, and the minimum 6.66% have experience of above 10 years.

3.1.10 Scale of business of poultry farms

In Raipur, 1.66% of farms raise 500-1000 chickens, while 5% of farms in Bastar fall in this category. Farms with 1000-1500 chickens account for 11.66% in Raipur and 8.33% in Bastar. Mid-sized farms with 1500-2000 chickens make up 25% in Raipur and 15% in Bastar, while farms with 2000-2500 chickens constitute 25% and 30% in Raipur and Bastar, respectively. The largest farms, raising 2500-3000 chickens,

are most common in both districts, with 36.66% in Raipur and 41.66% in Bastar. This indicates that Bastar has a slightly higher proportion of larger poultry farms.

3.1.11 Occupation status of poultry farmers

In Raipur district, the maximum 96.66% of respondents are full time poultry farmer and the rest 3.33% of respondents are part time poultry farmer, and in Bastar district, the maximum 93.33% of respondents are full time poultry farmer and the rest 6.66% of respondents are part time poultry farmer.

3.1.12 Labour distribution for poultry farms

In Raipur district, the 83.33% of respondents hired labour for the work at poultry farm and 16.66% of respondents use family labour for work, and in Bastar district, the 86.66% of respondents hired labour for the work at poultry farm and 13.33% of respondents use family labour for work.

3.2 Availability of Equipment's at Dairy Farms

The availability of equipment at dairy farms is a critical factor influencing the efficiency and productivity of dairy operations. This section examines the availability of various equipment used by dairy farmers in Raipur and Bastar districts. By understanding the extent of mechanization and technology adoption, we can assess the preparedness of these farms to meet modern dairy farming standards and identify areas where further support and investment are needed.

Table 2: Availability of equipment's at dairy farms

S. No.	Equipment	No. of farmer	
		Raipur district	Bastar district
1.	Automatic waterer	11	2
2.	Cow mats and bedding	25	19
3.	Manure scraper	9	3
4.	Bulk milk cooler	0	0
5.	Milking machine	9	6
6.	Feed mixer	0	0
7.	Silage cutter	0	0
8.	Calf feeder	0	0
9.	Cow activity monitor	0	0
10.	Thermometer	49	17
11.	Racker	41	35
12.	Manure spreader	3	1

3.2.1 Automatic waterers

Automatic waterers are devices designed to provide livestock with a constant supply of fresh water, refilling automatically as animals drink. Price - 1,000 to 7,500 ₹.

3.2.2 Cow mats and bedding

Cow mats and bedding are materials placed on barn floors to provide a comfortable, insulated, and non-slip surface for cows to rest and lie down. Price - 1,500 to 3,500 ₹.

3.2.3 Manure scrapers

Manure scrapers are tools or automated systems designed to remove manure from barn floors, maintaining cleanliness and hygiene in livestock housing areas. Price - 2,000 to 5,000 ₹.

3.3 Suggestion of mechanization for dairy farms of Raipur and Bastar district: The implementation of mechanization in the dairy farming sectors of Raipur and Bastar districts presents diverse outcomes and considerations. Analysis of current farming practices indicates a substantial opportunity for improvement through mechanization.

3.3.1 Bulk milk coolers

Bulk milk coolers are large tanks used to rapidly cool and store fresh milk at a low temperature to maintain its quality until it can be processed or transported. Price - 1, 00,000 to 2, 50,000 ₹.

3.3.2 Milking machines

Milking machines are automated devices used to extract milk from dairy cows efficiently and hygienically. It reduce milking time and ensure consistent milking. Price - 50,000 to 1, 50,000 ₹.

3.3.3 Feed mixers

Feed mixers are machines designed to blend different feed ingredients thoroughly, ensuring a balanced diet for livestock. Price - 50,000 to 10, 00,000 ₹.

3.3.4 Silage cutters

Silage cutters, also known as silage choppers or forage harvesters, are agricultural machines used to harvest and chop

crops such as corn, grass, or other forage crops into small pieces for silage production. Price - 1,50,000 to 5,00,000 ₹.

3.3.5 Calf feeders: Calf feeders are devices designed to provide milk or milk replacer to young calves, ensuring they receive proper nutrition for growth and health. Price - 500 to 2,000 ₹ per unit.

3.3.6 Cow activity monitors: Cow activity monitors are electronic devices worn by cows to track various behavioral

and physiological parameters, providing insights into their health, fertility, and overall well-being. Price - 5,000 to 15,000 ₹ per unit.

3.4 Availability of Equipment's at Poultry Farms

The availability of equipment's at poultry farms significantly impacts the operational efficiency, productivity, and overall health management of poultry operations. This section investigates the types and availability of equipment used by poultry farmers in Raipur and Bastar districts.

Table 4: Availability of equipment's at poultry farm

S. No.	Equipment	No of farmer	
		Raipur district	Bastar district
1	Automated feeder	60	60
2	Automated drinker	60	60
3	Ventilation system	60	60
4	Nesting box	32	23
5	Lighting system	60	60
6	Thermometer	56	43
7	Sprinkler	60	60
8	Egg collector	24	18
9	Egg incubator and hatcher	6	2
10	Brooder	28	46
11	Weighing machine	56	42
12	Racker	31	19

3.4.1 Automated feeders

Automated feeders are mechanized systems designed to dispense feed to poultry in a controlled and efficient manner. Price - 200 to 800 ₹ per unit.

3.4.2 Automated drinkers

Automated drinkers are devices designed to provide a continuous and controlled supply of water to poultry, ensuring that birds have access to fresh and clean water at all times. Price - 200 to 800 ₹ per unit.

3.4.3 Ventilation systems

Ventilation systems in poultry farms are designed to maintain optimal air quality by regulating airflow, temperature, and humidity, ensuring a healthy environment for the birds. Price - Cooler 3,000 to 8,000 ₹ per unit, Exhaust fan 500 to 3000 ₹ per unit.

3.4.4 Nesting boxes

Nesting boxes are enclosed spaces designed for laying hens to lay their eggs in a comfortable, clean, and secure environment. Price - 200 to 800 ₹ per unit.

3.4.5 Lighting systems

Lighting systems in poultry farms are setups designed to provide artificial light to regulate the day-night cycle of birds, which influences their behavior, growth, and productivity. Price - 100 to 500 ₹ per unit.

3.4.6 Temperature measuring device

Temperature measuring devices are tools used to monitor and record the temperature within poultry houses, ensuring optimal environmental conditions for bird health and productivity. Price - 500 to 2,000 ₹ per unit.

3.4.7 Sprinkler

Sprinklers are devices used to distribute water in a fine spray to maintain humidity levels and cool the environment in

poultry houses, ensuring the comfort and health of the birds. Price - 500 to 2,000 ₹ per unit.

3.5 Suggestion of mechanization for poultry farms of Raipur and Bastar district

By incorporating modern mechanization techniques, poultry farmers can significantly enhance their operational efficiency, reduce labour costs, and improve overall production quality.

3.5.1 Egg handling equipment (collector)

Egg handling equipment refers to devices and systems used in poultry farms to collect, clean, grade, and pack eggs efficiently and hygienically. Price - 1000 to 5000 ₹.

3.5.2 Incubators and hatchers

Incubators and hatchers are essential equipment in poultry farming used to artificially hatch eggs by providing controlled conditions of temperature, humidity, and ventilation. Price - 20,000 to 1,00,000 + ₹.

3.5.3 Brooding equipment

A brooder is an enclosure or device used to provide a warm and controlled environment for young chicks, ensuring their comfort and survival during the initial stages of life. Price - Gas brooder 1000 to 2000 ₹ per unit, Husk brooder 500 to 1500 ₹ per unit.

3.6 Economic status of dairy farm and poultry farm in Raipur and Bastar districts

A significant factor influencing these economic outcomes is the level of mechanization and technology adoption on the farms.

By examining the impact of mechanization on economic performance, we can understand how investments in modern equipment and practices enhance the efficiency, productivity, and profitability of dairy and poultry farming.

Table 5: Economic status of dairy farm in Raipur and Bastar districts

S. No.	Production cost	Cost (per animal Annually)	
		Raipur district	Bastar district
1.	Feed	18,000 ₹	17,500 ₹
2.	Labour	13,000 ₹	12,000 ₹
3.	Veterinary	2,500 ₹	2,600 ₹
4.	Breeding	1,500 ₹	1,300 ₹
5.	Water	700 ₹	500 ₹
6.	Electricity	1,100 ₹	900 ₹
7.	Miscellaneous	1,200 ₹	1,000 ₹
Total Production cost		38,000 ₹	35,800 ₹
S. No.	Revenue cost	Cost (per animal Annually)	
1.	Milk production	2,000 liters	2,000 liters
2.	Milk sales (1liters price = 60 ₹, 54 ₹)	1,20,000 ₹	1,08,000 ₹
3.	By product (manure)	6,000 ₹	5,500 ₹
4.	Govt. Subsidies	2,000 ₹	2,000 ₹
Total Revenue cost		1,28,000 ₹	1,15,500 ₹
S. No.	Profitability	Profit (per animal Annually)	
1.	Profit	90,000 ₹	79,700 ₹

Table 6: Comparison of cost economic data of normal dairy farm and slightly mechanized dairy farm

S. No.	Production cost	Cost (per animal Annually)	
		Normal farm	Slightly mechanized farm
1.	Feed	18,000 ₹	18,000 ₹
2.	Labour	13,000 ₹	11,500 ₹
3.	Veterinary	2,600 ₹	2,500 ₹
4.	Breeding	1,500 ₹	1,500 ₹
5.	Water	700 ₹	700 ₹
6.	Electricity	1,000 ₹	1,100 ₹
7.	Miscellaneous	1,100 ₹	1,200 ₹
Total Production cost		37,900 ₹	36,500 ₹
S. No.	Revenue cost	Cost (per animal Annually)	
1.	Milk production	1,850 liters	2,000 liters
2.	Milk sales (1liters price = 60 ₹)	1,11,000 ₹	1,20,000 ₹
3.	By product (manure)	5,000 ₹	6,000 ₹
4.	Govt. Subsidies	2,000 ₹	2,000 ₹
Total Revenue cost		1,18,000 ₹	1,28,000 ₹
S. No.	Profitability	Profit (per animal Annually)	
1.	Profit	80,100 ₹	91,500 ₹

Table 7: Economic status of poultry farm (broiler) in Raipur and Bastar districts

S. No.	Production cost	Cost (1,000 chicks in 45 days)	
		Raipur district	Bastar district
1.	Chicks	40,000 ₹	38,000 ₹
2.	Feed	82,500 ₹	82,500 ₹
3.	Medicine	8,000 ₹	8,000 ₹
4.	Electricity	12,000 ₹	10,000 ₹
5.	Labour	10,000 ₹	10,000 ₹
6.	Water	3,000 ₹	2,500 ₹
7.	Miscellaneous	9,000 ₹	9,000 ₹
Total Production cost		1,64,500 ₹	1,60,000 ₹
Mortality (%)		18%	15%
S. No.	Revenue cost	Cost (1,000 chicks in 45 days)	
1.	Chicks selling price	2,32,000 ₹ With mortality (1,90,240 ₹)	2,10,000 ₹ With mortality (1,78,500 ₹)
Total Revenue cost		1,90,240 ₹	1,78,500 ₹
S. No.	Profitability	Profit (1,000 chicks in 45 days)	
1.	Profit	25,740 ₹	18,500 ₹

Table 8: Economic status of poultry farm (layer) in Raipur and Bastar districts

S. No.	Production cost	Cost (1,000 chicks annually)	
		Raipur district	Bastar district
1.	Chicks	35,000 ₹	36,000 ₹
2.	Feed	8,71,200 ₹	8,44,800 ₹
3.	Medicine	80,000 ₹	79,000 ₹
4.	Electricity	1,44,000 ₹	1,38,000 ₹
5.	Labour	1,20,000 ₹	1,14,000 ₹
6.	Water	30,000 ₹	29,000 ₹
7.	Miscellaneous	90,000 ₹	84,000 ₹
Total Production cost		13,70,200 ₹	13,24,800 ₹
Mortality (%)		15%	12%
S. No.	Revenue cost	Cost (1,000 chicks annually)	
1.	Egg sales (275 eggs per year)	15,12,500 ₹	13,75,000 ₹
2.	Manure	24,000 ₹	33,000 ₹
3.	Chicken sale (after one year)	1,14,750 ₹	1,14,400 ₹
Total Revenue cost		16,51,250 ₹	15,22,400 ₹
S. No.	Profitability	Profit (1,000 chicks annually)	
1.	Profit	2,81,050 ₹	1,97,600 ₹

Table 9: Comparison of cost economic data of normal poultry farm and slightly mechanized poultry farm

S. No.	Production cost	Cost (1,000 chicks annually)	
		Normal farm	Slightly mechanized farm
1.	Chicks	36,000 ₹	36,000 ₹
2.	Feed	8,71,200 ₹	8,71,200 ₹
3.	Medicine	89,000 ₹	90,000 ₹
4.	Electricity	1,42,000 ₹	1,42,000 ₹
5.	Labour	1,20,000 ₹	1,02,000 ₹
6.	Water	31,000 ₹	32,000 ₹
7.	Miscellaneous	84,000 ₹	84,000 ₹
Total Production cost		13,73,200 ₹	13,57,200 ₹
Mortality (%)		20%	12%
S. No.	Revenue cost	Cost (1,000 chicks annually)	
1.	Egg sales (275 eggs per year)	15,12,500 ₹	15,12,500 ₹
2.	Manure	24,000 ₹	24,000 ₹
3.	Chicken sale (after one year)	1,35,000 ₹ With mortality (1,08,000 ₹)	1,35,000 ₹ With mortality (1,18,800 ₹)
Total Revenue cost		16,44,500 ₹	16,55,300 ₹
S. No.	Profitability	Profit (1,000 chicks annually)	
1.	Profit	2,71,300 ₹	2,98,100 ₹

- A normal dairy farm generates an annual profit of 80,100 ₹ per animal, reflecting the typical income derived from conventional practices.
- A slightly mechanized dairy farm, which incorporates basic technological advancements and equipment, achieves a higher annual profit of 91,500 ₹ per animal.
- A normal poultry farm yields an annual profit of 2,71,300 ₹ per 1,000 chicks, reflecting the earnings from conventional farming practices.
- A slightly mechanized poultry farm, which incorporates basic technological advancements and equipment, achieves a higher annual profit of 2,98,100 ₹ per 1,000 chicks.

Conclusion

The gap analysis revealed that both the Chhattisgarh Plains and Bastar Plateau exhibit significant deficiencies in adopting modern mechanization techniques. Traditional practices still dominate these regions, with only limited use of advanced machinery and gadgets. The Chhattisgarh Plains show slightly higher levels of mechanization compared to the Bastar Plateau, primarily due to better infrastructure and accessibility.

The majority of farmers in Raipur and Bastar districts are utilizing basic and often outdated equipment. In the dairy sector, manual milking, manure scrapers and rakers are common, while the poultry sector relies on manual feeders, simple lighting systems, and basic sanitation tools. Advanced machinery, such as automated milking machines, bulk milk coolers, cow activity monitors, egg incubators and borders, are rarely found, indicating a substantial lag in the adoption of modern technologies. This outdated equipment limits operational efficiency and hinders potential productivity gains.

The study underscored the necessity for advanced mechanization in both the dairy and poultry sectors to improve efficiency and productivity. For the dairy sector, the introduction of bulk milk coolers, automated milking machines, feed mixers, silage cutters, calf feeders, cow activity monitors and modern storage solutions would significantly enhance operations. In the poultry sector, the adoption of egg handling equipment (collector), incubators, and brooding equipment is essential. Implementing these technologies would reduce labour costs, improve hygiene standards, and boost overall productivity, leading to more sustainable and profitable farming practices in these regions.

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