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Review

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Eggs, supply, production, technology, growth,
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ABSTRACT

Poultry farming in India, in spite of several constraints, has progressed considerably during the last decade. The present study has been undertaken to examine various aspects related to the growth and development of poultry production in the country. Poultry production in India was confined to backyards till recently. Local breed of birds were reared for the supply of eggs and meat. The increasing demand for poultry products necessitates augmenting the supply by importing improved breeds of poultry. In 1961, the proportion of hybrid populations in the total population of poultry was about 2 percent. Within a couple of decades, these birds have dominated the market sidelining the indigenous birds. The technological advances have revolutionized the role and the structure of poultry industry in India. It became one of the most specialized enterprises in many parts of the country. A general confidence has been created among the people that green revolution has ushered an era of self-reliance in the food grain production. The rapidly growing population has created some doubts in the said hypothesis. In fact, crop production alone may not solve the food problem of the country. The advances in cereal technology, of course, can fill the empty stomach, but it may not help in the balanced growth of the human body. The chief ingredients of balanced diet also comprise proteins, fats, minerals and vitamins, which are essential for growth. The supply of these items can easily be increased through increased production of livestock products.

INTRODUCTION

In a short period, in the livestock sector poultry is the most efficient enterprise for increasing the supply of Desi red proteins, fats, minerals and vitamins. The broad objectives of this study are, as follows:

To study the existing status of poultry sector in India

To examine the growth pattern of poultry in different regions and

To construct developmental indices for poultry production in different states.

LITERATURE REVIEW

Headley (1964) estimated that production functions for egg-laying flocks of hybrid and leghorn hens raised on Iowa state farms. The regression analysis indicated that flock size, housing area, corn equivalent labor and protein equivalents significantly contributed for gross returns. Hunter (1981) studied the economic aspects of egg production in Australian poultry farms. That study revealed that feed



costs occupy a major share of total cost of production of eggs followed by cost of chicks and labor. Goutard & Magalhaes, (2006) have identified the major marketing channels of poultry and poultry products. Here, the marketing channel shows that a large number of middlemen are involved in the marketing chain between producers and consumers. It was found that an average trader handles between 40 to 100 chickens per week while the middleman manages 2000 eggs per month. Moreover, it is estimated that the average number of birds that are sold at local markets ranges from 30 to 400 per day.

According to Bhardwaj *et al.* (1995), in a study on cost behavior and marketing margins of broilers, observed that cost of raising broilers varied according to the size of poultry farms. In marketing broilers, the retailers earned maximum profits, whereas the producers' profit was only half of that of retailer. Bhardwaj *et al.* (1996), in a study of broilers in Haryana, concluded that the supply of broilers was affected by bird mortality and culling rate, which depended on bird age and size of poultry farms. The depletion rate decreased as the size of poultry farm increased. The study further showed that the marketing practices were influenced by the size of farms and seasons. Pandey *et al.* (1996a) studied the status of poultry production in India and also analyzed the behavior of production cost of poultry products in selected areas. The study showed that poultry had become a vital component of the farm economy as it generated additional income and employment in the rural area. The cost estimated revealed that feed alone accounted for about two-thirds of the total cost. The study concluded that availability of feed at reasonable prices would provide an incentive to the farmers to produce more poultry. Pandey *et al.* (1996b) observed that the development of poultry production was adversely affected by wide fluctuations in the demand. The study showed that rise in the price of eggs was comparatively lower than the rise in prices of milk, food articles and all commodities during the period of 1982-94. The production and disposal of eggs at poultry farms revealed that more than 98 percent of the eggs were sold for profit.

The main marketing agents were identified as wholesale dealer and contractors. Iqbaluddin (1996) mentions that in most of the poultry pockets in India, marketing was still controlled by private traders. Fluctuation in the prices of poultry products was one of the main constraints for attracting investment in the sector. Market Intervention Scheme (MIS) for

procurement of eggs in Andhra Pradesh, Tamil Nadu, Punjab, Haryana, Madhya Pradesh and Rajasthan by NAFED had shown encouraging results, though the magnitude of operation is very small. Seetharaman (1996) studied the pattern of poultry development in India. He observed that out of 9 states, with well-developed poultry industry, only in two of them, i.e., in Gujarat and Maharashtra, the poultry cooperatives were doing well. He recommended that poultry cooperatives need to be extended in all poultry producing states.

METHODOLOGY

Due to constraints of resources and time along with preliminary nature of this investigation, only 220 interviewers were chosen from Namakkal, Pollachi, Rasipuram and Vellore districts of Tamil Nadu. Stratified random sampling method was used to select the sample. To obtain a probability sample, considerable effort was devoted to selecting the appropriate sample plan. A preliminary version of the questionnaire was developed in English on the basis of insights from in-depth qualitative interviews with experts. Besides, personal observation was done where necessarily applicable. A pilot survey was conducted in the study area and the questionnaire was improved in that light. Interviewers were given a letter of introduction about the researcher so that respondents would see that the study was authentic. The telephone/mobile numbers were provided too, in case respondents wanted to verify the identity of the investigators or clarify any questions.

STATUS OF POULTRY IN INDIA

Poultry enterprises in India can distinctly be grouped into two categories i.e. developmental poultry farms and commercial poultry farms.

a) Developmental poultry farms

It refers to village/unorganized poultry production because this enterprise operates in a low scale, using less capital and traditional technology. The unit volume of production is low due to the above constraints. However, the concept of developmental poultry is very relevant for India's rural areas to enhance cash earnings of rural poor population. Poultry farming was included in various Central and State Government sponsored programs, such as Integrated Rural Development Program (IRDP), Special Livestock Production Program



(SLPP), Tribal Development Program (TDP), etc. to popularize poultry farming in rural areas. However, the growth of developmental poultry did not succeed at Desi red level.

b) Commercial poultry production

Commercial / industrial poultry production refer to large-scale enterprises where the number of birds per unit is large enough to reap maximum advantages of technological improvement. These enterprises present various economies of scale of operation and, thus, are able to absorb the fluctuations in demand and supply and in input cost. The growth of this sector has remained highly significant over the years. However, it has been confined to some pockets of the country.

POULTRY POPULATION AND ITS DISTRIBUTION

The poultry population in India in 1951 was 73.5 million birds. It increased to 138.5 million in 1972 (doubled) and about four times by 1992, i.e., 307.07 million. The growth in poultry population was 5.32 percent per annum between 1951-56, 5.47 percent per annum between 1977-82, and 5.79 percent per annum (maximum) between 1982-87. The minimum growth in population was recorded between 1961-66, i.e., 0.21 percent per annum. Distribution or spread of poultry birds over the space may be examined by two approaches:

- a) Distribution according to area (rural/urban) and
- b) Distribution according to different regions.

Poultry populations in rural/urban areas:

Based on the Livestock Census of 1987 and 1992, the distribution of poultry reveals the following interesting features:

Rural and semi-urban area accounted for the largest number of broilers (more than 90%).

Population of improved breeds of both layers and meat-type chickens increased much faster during the two periods as compared to Desi (Local) breeds.

The population of broilers had increased rapidly, i.e., 21% per annum as compared to layers.

The proportion of poultry distribution in two areas did not reveal much variation during the period.

The leading poultry producing states in different regions were Andhra Pradesh and Tamil Nadu in Southern Region, West Bengal and Bihar in Eastern

Region, Maharashtra in Western Region and Punjab in Northern Region.

Productivity of Desi (Local) and improved birds, i.e., eggs produced/year, also varied in different regions. Maximum productivity of Desi (Local) birds, i.e., 91 eggs/year, was reported in Eastern region and minimum of 15 eggs/year, was reported in Northern Region. In case of improved birds, the productivity was highest in Southern Region (241 eggs/year), followed by 238, in Western Region, 209, in Northern region and 204, in Eastern Region. State-wise, the productivity of Desi (Local) birds was maximum in Himachal Pradesh, i.e., 168 eggs/year and lowest in Nagaland, i.e., 79 eggs/year. In case of improved birds, the maximum productivity was 278 eggs/year, in Andhra Pradesh, and minimum of 180 eggs/year, again in Nagaland.

Regional distribution of hybrid parent stock revealed that it is heavily concentrated in Southern Region, with nearly 45% of layers and 37% of broilers. The Northern region ranked second, with 27% layers and 25% broilers. It was followed by the Western Region, with nearly 20% and 25% of layer and broilers, respectively. The Eastern region had only 9% of layers and 14% of broilers. State-wise concentration of percent stock of both layer parent and broilers reveals a similar trend. The ranking of different states was Andhra Pradesh (25% and 18%), Tamil Nadu (14% and 9%), Maharashtra (12% and 18%), Punjab (10% each) and West Bengal (3% and 9%) of layers and broilers, respectively.

POULTRY DEVELOPMENT IN INDIA

The stage of poultry farming in different states / UTs was examined by constructing developmental indices on parameters such as layer parent stock, number of improved birds relative to the total poultry population, number of hatcheries (both in private and public sector), and performance (i.e., number of eggs produced/year). This technique was used to build indices for major poultry producing states/UTs in the country. The Poultry Development Index was constructed for the major poultry producing states of Indian Union. The states were classified in ascending order of WPDI. This implies that the state with the lowest WPDI was the first mentioned and so on. Assam & N.E. States were found in first place in the order, i.e., poultry farming is the least developed in these states, followed by Bihar, Orissa, and Himachal Pradesh, etc. Andhra Pradesh presented the most developed poultry production in India. In order to classify all states into



two WPDI groups, the 0.52 level was arbitrarily chosen as the cut-off of different states classifying all states in two groups on the basis of low/high poultry farming development.

a. Growth in production.

Poultry products had shown a massive growth in the country after 1961. Egg production in that year was 2,881 million, which increased to about 30,000 millions in the year 1996. Broiler production starting from zero increased 400 million birds in the year 1996. Similarly, poultry meat, which was about 81 thousand tones in the year 1961, increased to 659 thousand tones in that same period. The increased production increased the availability of poultry products for consumption.

b. Growth in Production and Productivity of Eggs and Chicken Meat

Years	Production			Per capita availability	
	Eggs (Million)	Broiler (Million)	Poultry meat(000' t)	Egg (number)	Poultry meat (grams)
1991	2881	2	81	7	188
1999	5340	4	121	10	220
2001	12500	30	179	18	266
2005	23300	190	440	28	498
2009	33000	700	875	36	-
2012	35000	800	975	38	-

c. Growth in Egg Production

Growth in egg production in the major producing states of different regions of the country was examined during the period of 1980-98. The period was further divided in to two periods, i.e., 1980-89 and 1990-98. Compound growth and simple growth rates were calculated for the three periods and four regions.

1. Northern Region- There was a significant growth in egg production in all the egg-producing states of the region. Punjab presented a maximum growth rate of 3.12%/year during first period and 3.03%/year in the intermediate period, followed by Himachal Pradesh (3.03, 2.94) Haryana (2.98, 2.96) and U.P. (2.80, 2.86). The period of 2002-03 had the lowest growth rate in egg production in the region.

2. Western Region – The major egg producing states in the region showed the most significant growth in egg production during first period, except for Rajasthan, where the second period had shown a much faster growth, with 2.99%/year. The overall growth in the states of Gujarat, Madhya Pradesh, Maharashtra and Goa remained at 2.90, 2.89, 2.83 and 2.82%/year, respectively.

3. Southern Region: In this region, a maximum and highly significant growth rate of 3.14%/year was observed in Tamil Nadu during the first period, 2.79%/year in the second period and 2.96%/year in both periods, followed by Andhra Pradesh, with 2.97, 2.92 and 2.91%/year, respectively., Karnataka grew 2.88, 2.83 and 2.84%/year and Kerala had 2.86, 2.82, 2.83%/year, respectively, in the first, second and entire period of study.

4. Eastern Region: In the Eastern Region, Sikkim presented maximum growth egg production rates of 3.20, 2.85 and 3.04%/year, in first, second and entire period, followed by West Bengal with 3.15, 2.78, 2.92% year, Nagaland with 2.99, 2.79 and 2.95%/year, Meghalaya with 2.99, 2.80 and 2.86%/year, Manipur with 2.87, 2.68 and 2.85%/year, Bihar with 2.93, 2.12 and 2.82%/year, and Assam with 2.87, 2.77 and 2.81%/year. At national level, egg production growth rate was higher in first period, with 2.96%/year. In the second period, it was 2.84%/year and in entire period the growth was 2.90%/year.

d. Growth in Productivity

Productivity of Desi (Local) and improved birds in different regions was examined for the period of 1987-88 to 1994-95. The mean productivity level of Desi (Local) birds was maximum, i.e., 156 eggs/year, in Himachal Pradesh, in Northern region, and minimum, with 62 eggs/year, in Manipur, in Eastern Region. In case of improved birds, the maximum productivity of 278 eggs/year was reported in Andhra Pradesh, in the Southern region, and minimum of 109 eggs/year, in Manipur State, in the Eastern Region.

SUMMARY AND CONCLUSIONS

The increasing demand for poultry products has transformed poultry production activity into a full-fledged industry from a mere household/backyard activity until recently. Technological advances have revolutionized the role and the structure of poultry industry in India. The distribution of the poultry population suggests that it is concentrated in some limited pockets. Forty two percent of the total population of poultry is confined to the Southern region, with 22% in the Eastern Region and 20% in Western Region, with only about 16% in the Northern region. Improved poultry breeds account for 59% of the total bird population, contributing with about 89% of the total egg production in the country.


Table 1 – Distribution of Birds (Number of birds “000”)

Type of birds	2000			2008			Annual Growth
	Rural	Urban	Total	Rural	Urban	Total	
1. Cocks Total	32282(94.05)	2041(5.95)	34323	40677(93.02)	3054 (6.98)	43731	4.43
a) Desi	28288(95.05)	1473(4.95)	29761	31741(93.38)	2251(6.62)	33.992	2.21
b) Improved	3994(87.55)	568(12.45)	4562	8936(91.75)	803(8.25)	9739	15.48
2. Hens a) Desi	68129(94.65)	3853(5.35)	71982	69039(93.29)	4981(6.73)	74020	0.16
b) Improved	30003(85.78)	4975(14.22)	34978	41962(90.70)	4303(9.30)	46265	5.59
3. Total Chicken below 5 months	98133(91.75)	8828(8.25)	106961	111001(92.28)	9284(7.72)	120285	2.05
Desi for eggs	28.142(93.53)	1946(6.47)	30088	42581(93.54)	2940(6.46)	45521	8.35
Desi for meat	13058(94.25)	797(5.75)	13855	29610(93.50)	2060(6.50)	31670	17.53
Total	60494(95.50)	2848(4.50)	63342	72191(93.52)	5000(6.48)	77191	3.82
a) Improved for eggs	10800(86.44)	1694(13.56)	12494	22136(87.66)	3115(12.34)	25251	14.89
b) Improved for meat	5600(86.81)	851(13.90)	6451	15245(86.78)	2322(13.22)	17567	21.57
Total	18335(86.69)	2814(13.31)	21149	37381(87.30)	5437(12.70)	42818	14.84
Total chicken	78829(93.30)	5662(6.70)	84491	109572(91.30)	10437(8.70)	120009	7.03
Total	215480(92.76)	16815(7.24)	232295	261250(91.98)	22775(8.02)	284025	2.50

Data Source: Basic Animal Husbandry Statistics 2009 (AHS Series-7) (I did not find the indication of this reference)

Table 2 – Regional Distribution of Poultry Birds (Population in ‘000.)

Regions/State	(2010-11)						Productivity	
	Desi birds population	% of all India Desi birds	Improved birds population	% of all India Improved bird's population	Total No. of birds	% of all India total population	Desi	Improved
A. Northern Region								
1. Haryana	344	0.48	2695	3.69	3039	2.10	144	217
2. Himachal	227	0.32	147	0.20	374	0.26	168	195
3. J&K	1377	1.92	396	0.54	1773	1.23	162	200
4. Punjab	-		12011	16.42	12011	8.30	-	203
5. Uttar Pradesh	2590	3.62	1195	1.63	3785	2.62	128	234
Regional Total	4538	6.34	16444	22.48	20982	14.51	150.5	209.8
B. Western Region								
1. Gujarat	1351	1.89	1349	1.84	2700	1.87	95	252
2. Rajasthan	981	1.37	1262	1.73	2243	1.55	106	240
3. Maharashtra	10120	14.14	5187	7.09	15307	10.58	113	263
4. Madhya Pradesh	4052	5.66	3788	5.18	7840	5.42	97	199
Regional Total	16504	23.06	11586	15.84	28090	19.42	100	238
C. Southern Region								
1. Andhra Pradesh	8035	11.23	16225	22.19	24260	16.77	117	278
2. Karnataka	6980	9.75	3221	4.40	16201	7.05	96	249
3. Kerala	4113	5.75	6287	8.60	10400	7.19	121	205
4. Tamil Nadu	4481	6.25	11464	15.68	15945	11.02	88	232
Regional Total	23609	32.98	37201	50.87	66806	42.03	100	241
D. Eastern Region								
1. Bihar	7970	11.14	3041	4.16	11011	7.61	88	187
2. Orissa	3731	5.21	1063	1.45	4794	3.31	91	205
3. West Bengal	10655	14.89	1782	2.44	12437	8.60	114	268
4. Assam	2661	3.72	394	0.54	3055	2.11	83	183
5. Nagaland	216	0.30	143	0.20	359	0.25	79	180
Regional Total	25233	34.26	64.23	8.79	31656	21.88	91	204
All India	71558		73127		144685		106	233
	100		100		100		100	

Source: Basic Animal Husbandry Statistics – 2012


Table 3 – Regional Growth in Egg Production

Region/States	Period 1999-2000			Period 2000-01			Period 2001-02		
	Compound Growth	Simple Growth	R 2	Compound Growth	Simple Growth	R 2	Compound Growth	Simple Growth	R 2
A. Northern Region									
1. Haryana	2.98**	1.09**	0.73	2.91*	1.07*	0.77	2.96**	2.08**	0.92
2. H.P.	3.03**	1.09**	0.98	2.25*	1.05*	0.78	2.94**	1.07**	0.96
3. J & K	2.76*	1.01*	0.25	2.87**	1.05**	0.90	2.82**	1.03**	0.86
4. Punjab	3.12**	1.14**	0.98	2.92**	1.07**	0.97	3.03**	1.11**	0.97
5. Chandigarh	2.82*	1.03	0.33	2.55*	-1.05*	0.54	2.73	1.00	0.01
6. Delhi	2.72	1.00	0.12	2.88*	1.05*	0.61	2.72	1.00	0.2
7. Uttar Pradesh	2.80**	1.03**	0.95	2.85**	1.05**	0.93	2.86**	1.05**	0.97
B. Western Region									
1. Goa	2.91*	1.06*	0.65	2.79*	1.02*	0.76	2.82**	1.03**	0.72
2. Gujarat	2.85**	1.04**	0.84	2.80*	1.03*	0.75	2.90**	1.96**	0.93
3. Rajasthan	2.92**	1.07**	0.95	2.99**	1.09**	0.95	2.90**	1.08**	0.98
4. M.P.	2.91*	1.06*	0.78	2.83**	1.04**	0.96	2.89**	1.06**	0.94
5. Maharashtra	2.88**	1.06**	0.99	2.84**	1.04**	0.98	2.87**	1.05**	0.99
C. Southern Region									
1. Andhra Pradesh	2.97**	1.09**	0.93	2.92**	1.07**	0.86	2.91**	1.07**	0.95
2. Karnataka	2.88**	1.06**	0.99	2.83**	1.04**	0.94	2.84**	1.04**	0.98
3. Kerala	2.86**	1.05**	0.93	2.82**	1.03*	0.53	2.83**	1.04**	0.89
4. Tamil Nadu	3.14**	1.14**	0.85	2.79**	1.92**	0.87	2.96**	1.08**	0.85
D. Eastern Region									
1. Arunachal	2.79**	1.02**	0.87	2.73	1.00	0.14	2.72	1.00	0.02
2. Assam	2.87**	1.05**	0.92	2.77**	1.01*	0.60	2.81**	1.03**	0.89
3. Bihar	2.93**	1.07**	0.98	2.12**	1.00**	0.88	2.82**	1.03**	0.84
4. Manipur	2.97**	1.09**	0.93	2.68	-1.01	0.34	2.84**	1.05**	0.78
5. Meghalaya	2.99**	1.09**	0.91	2.80**	1.03**	0.98	2.86**	1.05**	0.85
6. Mizoram	2.60*	-1.04	0.04	3.38	1.22	0.46	2.83*	1.04*	0.11
7. Nagaland	2.99**	1.09**	0.85	2.79**	1.02**	0.86	2.95**	1.08**	0.91
8. Orissa	2.76*	1.01*	0.17	2.91**	1.07**	0.86	2.86**	1.05**	0.84
9. Tripura	2.85**	1.04**	0.96	2.94**	1.07**	0.93	2.85**	1.04**	0.94
10. West Bengal	3.15**	1.14**	0.92	2.78**	1.02**	0.96	2.92**	1.07**	0.80
11. Sikkim	3.20**	1.16*	0.76	2.85**	1.04**	0.94	3.04**	1.11**	0.87
All India	2.96**	1.08**	0.98	2.84**	1.04**	0.98	2.90**	1.06**	0.97

Data Source: Basic Animal Husbandry Statistics – 2012

The funds allocated for poultry farming development during the various plans are minimal. However, the poultry sector has achieved production goals satisfactorily. The stage of poultry farming development in different states reveals that in most of the states, the poultry sector is still not well developed. Only few states like Andhra Pradesh, Maharashtra, Haryana, Punjab, Tamil Nadu and Gujarat have significant poultry production.

The study on poultry production cost reveals that feed is the main cost component, followed by other items, such as cost of one-day-old chick, cost of medication and labor cost. The marketing channel is well organized and operates in a fairly competitive environment. The prices in wholesale market, as well as in the retail market, over the years, have increased at a significant rate. The price series correlation in the

wholesale and retail market during the period under study remained positive and significantly high, which implies that wholesale and retail markets showed strong integration in the commodity market and the price movements in one market are fully transmitted to other markets.

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Table 4 – Poultry production (Period 2000-01 to 2009-10)

Region/State	Desi Birds			Improved Birds		
	Mean	Std.dev.	C.V.	Mean	Std. Dev.	C.V.
1. Northern Region						
Haryana	145.875	12.3	8.5	203.250	15.173	7.456
H.P.	156.875	11.344	7.231	183.375	7.425	4.049
U.P.	123.500	3.251	2.633	182.000	32.562	17.891
2. Western Region						
Gujarat	88.125	3.681	4.178	240.125	7.699	3.206
M.P.	113.600	28.315	24.927	199.000	18.924	9.512
Maharashtra	116.250	1.909	1.642	247.625	37.705	15.227
Rajasthan	99.625	6.163	6.186	240.625	0.916	0.381
3. Southern Region						
A.P.	138.625	11.722	8.456	278.750	22.575	8.099
Karnataka	46.895	1.356	1.399	248.375	0.518	0.208
Kerala	115.500	6.141	5.317	201.750	4.062	2.013
T.N.	93.000	17.760	19.097	231.625	7.110	3.070
4. Eastern Region						
Bihar	87.250	0.886	1.016	185.750	2.816	1.516
Manipur	62.875	4.794	7.625	109.375	11.538	10.549
Meghalaya	107.750	1.982	1.840	213.250	8.190	3.841
Mizoram	74.875	2.100	2.805	126.250	9.146	7.244
Nagaland	77.375	2.264	2.926	176.875	8.061	4.557
Orissa	94.000	1.773	1.886	206.125	20.003	9.704

Data Source: Basic Animal Husbandry Statistics – 2012

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