

# Poultry Integrator and Sustainable Livelihood Security - A Study of Broiler Sector in Bengaluru Region\*

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**Abstract:** Sustainable livelihood is a multifaceted concept and refers to maintenance or enhancement of access of rural families to food and income generating activities on a long term basis. In the Indian context where average farm size is very small, ought to be viewed in the context of enhancement of productivity, production and profitability of the activity of the adopted by the farmer, above all, for improvement of economic conditions of the farmers. Livestock system is known to enhance sustainable livelihoods for farmers. The present research \ investigation study was taken up in Bengaluru region of Karnataka state with overall objective of finding sustainable livelihood of stakeholders in poultry broiler sector development. The study was based on primary data obtained from 44 broiler farmers. The information was collected through structured interview schedule. Taking into account the measures evolved to depict economic, educational, habitat, food, health security and extent of community participation of households attempt has been made to construct livelihood security index for each sample household. Based on the value obtained for livelihood security index sample households are categorized into low, moderate and households with high index value. Realizing the importance of evolving a single measure capturing the variations in indicators used to measure the management efficiency of poultry farmers, attempt was made to construct composite management index. First-five principal components considered for the analysis together captured nearly 70 per cent of variations in original data set. Principal components were run using R-software. The first-three principal component accounted for fifty per cent of variation in the data set as evident from Eigen values. Based on the value of the index poultry farmers are classified into low, moderate and high management orientation category. Nearly 30 per cent of the farmers were categorized under low and high category, while 40 per cent of farmers have moderate management orientation. The study indicates that the presence of strong institutions like Venkateswar Hatcheries Private Limited (VHPL) has provided required backward and forward linkages enabling sector to register high rate of growth. The broiler sector has played a vital role improving the economic status of rural households, especially vulnerable section and has provided strength to livelihood security to poultry farming families in the study area.

**Keywords:** livelihood, security index, management index, poultry, broiler, sustainable development.

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## 1. Introduction

Livestock sector is an important subsector of the agriculture of Indian economy. Agriculture along with animal husbandry, dairying and fisheries activities continue to be an integral part rural economy. According to estimates of the Central statistics office (CSO), the value of output of livestock sector at current prices was about 5, 91, 691 crore during 2015-16 which is about 28.5 per cent of the value of output from agricultural and allied sector. It forms an important livelihood activity for most of the farmers, supporting agriculture in the form of critical inputs, contributing to the health and nutrition of the household, supplementing incomes, offering employment opportunities, and finally being a dependable “bank on hooves” in times of need. It acts as a supplementary and complementary enterprise.

According to NSSO situation assessment survey of agricultural households (SAS) in 2013 (70th Round), annual income of farm households from farm as well as non-farm sources was Rs. 77, 112. Sixty per cent of total income of agricultural households was derived from farm activities comprising of cultivation and farming of animals and 40 per cent was derived from non-farm sources such as, wage, salary, non-farm business, etc. The share of livestock activity in total farm income of agricultural

household was close to 19.89 per cent (Ramesh Chand 2017).

The major challenge facing in today’s agriculture in the country is, how to enhance growth rate of agriculture and make agriculture a more profitable venture in the context of major challenges experienced by the farming sector in terms of shrinking resource base, increasing cost of production and impact due to climate change resulting in decline in crop productivity and income. Government of India seeks to double farmer incomes by 2022. This requires a multi-pronged strategy. This calls for integrating the various sub-sectors like crop production, livestock and value addition at rural household level to ensure livelihood security.

Indian poultry industry is one of the fastest growing segments of agriculture sector. The production of eggs and broilers has been rising at the rate of eight to ten per cent per annum. During the last four decades Indian poultry industry has undergone a paradigm shift in structure and operation mainly due to initiatives of private enterprises.

Poultry production in the country is emerging from an entirely unorganized and unscientific farming practice to a commercial production system with state-of-the-art technological interventions. Commercial poultry sector has advanced remarkably due to a scientific approach adopted by the industry and an enabling institutional support

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provided by the industry. Integrated production, market transition from live birds to chilled and frozen products, and arrangements that ensures supply of feed disease surveillance, monitoring and control has enabled poultry sector to achieve faster growth. It is hypothesized that technological intervention, forward and backward integration provided especially by private players has enhanced the managerial efficiency of poultry farmers.

Of late, poultry sector is under great stress\ strain and pressure due to the factors of rising demand, public health, nutrition, producer supplier, infrastructure, market competition, scale of economies, climate change, employment generation, socio-economic change etc. Therefore, need was felt to study the management orientation poultry farmers and examine the role of Poultry broiler sector in ensuring livelihood security of farmers. Thus the present study is undertaken with following specific objectives:

## 2. Objectives

- (a) Examine the managerial efficiency poultry farmers of Bangalore region of the State.
- (b) Analyze the role of broiler sector in ensuring livelihood security of farmers in Bangalore region of the Sate.

### Selection of sample for the study:

Karnataka has very congenial atmosphere for growth of poultry industry. Karnataka ranks 5<sup>th</sup> place in both chicken, egg and meat production in India. The districts leading in broiler chicken production include Bangalore rural, Tumkur, Kolar and Chikkaballapur. The districts popular in chicken egg production include Bellary, Chitradurga, Davangere, Raichur and Koppal.

There are small and large numbers of players in poultry meat (broiler) sector which are operating in the Bengaluru region. Some of the important brands are, Godrej, Lotus, Sneha, Suguna, Sujay, and Venkateswar Hatcheries Private Limited (VHPL).It is reported that VHPL has about 42 percent share in broiler business in the region. Hence VHPL was selected for the Present Research Study (Anon-2016).

Bangalore rural district was chosen to undertake the study, a random sample of 44 households spread across the district who have established poultry farm on commercial scale and are under contract with VHPL, was chosen for the study. Data was collected by personally visiting the households and using structured pretested schedule.

## 3. Methodology

### Composite Management Index (CMI):

Based on the literature search, fifteen indictors were identified to measure the management orientation of poultry farmers. They are, (1) Planning orientation, (2) Production orientation, (3) Marketing function, (4) Attitude towards good management practices, (5) Deferred gratification, (6) Economic orientation (7) Achievement

motivation, (8) Innovativeness (9) Scientific orientation (10) Aspirations, (11)Risk orientation, (12) Training exposure, (13) Extension participation, (14) Farm-scientist contact and (15) Mass media participation. Appropriate scale and statements were used for measuring these indicators.

Realizing the importance of evolving a single measure capturing the variations in indicators used to measure the management efficiency of poultry farmers, attempt has been made to construct composite management index. The method of principle component analysis (PCA) is used to construct indices.

For construction of composite management index (CMI) procedure adopted by Feroze and Chauhan (2010) is adopted. Procedure is briefly described below.

The factor loadings and Eigen values for the first-five principal components are obtained that explained nearly 70 per cent variation in the data set. For construction of composite index weights of individual indicators have been assigned on the basis of principal component analysis. To obtain weights, the extracted factor loadings is multiplied by the Eigen values, i.e., the 1<sup>st</sup> Eigen value is multiplied with the extracted factor loadings and 2<sup>nd</sup> Eigen value is multiplied with second extracted factor loadings, considering only absolute values. The values so obtained across five principal components considered for the analysis are added in case of each indicator to get the weights for that particular indicator. Similarly weights are obtained for other indicators, too. By summing all the weights we get the grand total weight.

The normalized value of each indicator is multiplied with respective weight. Then sum of each multiple ratio n is divided by the grand total weight to obtain index.

$$I = \frac{\sum_{i=1}^n X_i \left[ \sum_{j=1}^n |L_{ij}| E_j \right]}{\sum_{i=1}^n \left[ \sum_{j=1}^n |L_{ij}| E_j \right]}$$

The Formula used to determine management index (MI) Where I is index, X<sub>i</sub> is normalized values of i-th indicator, L<sub>ij</sub> is the factor loading of i-th variable on the j-th principal component (PC), E<sub>j</sub> is the Eigen value of j-th PC.

### Construction Livelihood Security Index (CLSI) :

Before taking up the main analysis it would be appropriate recall the concept of livelihood being adopted in the study. Household livelihood security is defined as adequate and sustainable access to income and resources to meet basic needs including adequate access to food, potable water, health facilities, educational opportunities, housing, time for community participation and social integration. Keeping the broad definition of livelihood in view, an attempt was made to construct livelihood security index for the sample households pursuing poultry as a livelihood

activity in Bengaluru region of Karnataka. Variables that enable us to capture economic, educational, habitat, food, health security and extent of community participation of households were considered and they were combined together to derive livelihood security index of households.

Taking into account the measures evolved to depict economic, educational, habitat, food, health security and extent of community participation of households attempt has been made to construct livelihood security index for each sample household. Total score was obtained by adding the score/ value obtained for each of the measures. The total score so obtained were converted into standard normal variants by subtracting the score obtained by each of the household by the mean of the sample and dividing the difference by the standard deviation of the total score. Based on the value obtained for livelihood security index sample households are categorized into low, moderate and households with high index value.

#### **Correlation Analysis:**

Correlation coefficient between Livelihood Security Index and with variables that capture economic, educational, habitat, food, health security and extent of community participation of households were estimated to know which factor exert influence in securing livelihood to poultry farmers.

## **4. Results and Discussions**

#### **Management Orientation of Poultry Farmers:**

We shall begin our analysis by looking into the scores obtained for fifteen indicators considered for construction of Composite Management Index (CMI) for the poultry farmers. The results are presented in Table-1.

Mean values of the most of indicators considered for construction of Composite Management Index (CLSI) are close to upper limit that is maximum value attainable by the indicators. In other words it is found that the distribution of scores of most of the indicators are negatively skewed with more number of sample households are having higher scores than average. However it may be observed that innovativeness, training exposure and mass media participation have relatively lesser scores and gap between the average score attained by sample respondents and maximum score attainable is significant.

Further it may note that first-five principal components were considered for the analysis as they together capture nearly 70 per cent of variations in original data set. Factor loadings for first-five principal components for significant variables are presented in Table-2 along with the Eigen values. Principal components are run using R-software. Further we may note from the Table-2 that first-three principal component account for fifty per cent of variation in the data set as evident from Eigen values.

The results presented in Table-3 reveals that out fifteen indicators considered for the analysis to capture variation

in management orientation of poultry farmers, only for seven indicators F-values have turned out to be significant. They are, planning orientation, production orientation, economic orientation, achievement motivation, aspiration, risk orientation and farm-scientist contact. The other eight indicators turned out to be non-significant indicating that the mean values of three categories of farmers, viz., low, moderate and high do not appear to be significantly different. Interestingly all the seven indicators which are statistically significant reflect the individual characteristics of poultry farmers.

Further based on the value of the index farmers are classified into low, moderate and high management orientation category. The results are presented in Table-4. It may be noted from the table that nearly 30 per cent of the farmers are categorized under low and high category while 40 per cent of farmers have moderate management orientation i.e. 13, 13 and 18 respectively.

#### **Livelihood Security Analysis of Poultry Farmers:**

Variables that considered to capture different household livelihood security measures such as economic, educational, habitat, food, health security and extent of community participation of households are detailed in Table-5.

The values obtained for different household security measures using the primary data are presented in Table-6. It may be noted from the Table-6 that poultry farmers of Bengaluru rural district on an average possess nearly two acres of irrigated land and having an annual income of Rs 4.58 lakhs. It may be further noted here that majority of them have eight to ten years of experience in poultry farming. Most of sample households have high school level of education and a few of them are graduates. In regard to educational facilities available, all the selected villages have primary schools within the village and secondary schools are located within two-three kms distance from the village. Thus households are well secured in terms imparting education their children. This fact is well reflected in the sample data as majority of children of selected farmers have completed high school level of education and some of them are pursuing higher education in Bengaluru city which is very near and have good transport facilities. The other indicator to be considered while assessing household livelihood security is type of habitat in which sample farmers dwelling. During the survey the conspicuous fact that emerged was most of the sample farmers have pucca (RCC) house and many of the farmers are also maintaining farm sheds to keep their farm equipment's. Besides majority of farmers have maintained two wheelers and possess other consumer durable goods such as television, refrigerators, etc.

Coming to health security, majority of households have maintained good health conditions except suffering from minor ailments. All the selected villages have facilities of primary health care centre. More importantly all the households have toilets facilities. In order to measure extent of food security attained by households, a simple measure like extent of net income of households above /



below the poverty line was calculated. It may be seen from Table-3 that net annual income of farmers is 70 to 80 per cent more than the official poverty line prescribed by authority.

The other indicator to be considered while deriving household livelihood security index is community participation. In order to capture this aspect, two measures were considered, viz., social participation and cosmopolitanism. Social participation is measured by eliciting the information from respondent how often they take part in various social meetings at village / panchayat level. The cosmopolitanism was measured by seeking information about the number visits they make to nearest town / city for various purposes. It may be noted that the average score obtained by sample respondents in regard to social participation is 1.50 indicating the fact that majority of sample households take part in various activities organized at village / panchayat level. Coming to cosmopolitanism, it is interesting to note that the average score of sample farmers was only 0.68 indicating the fact that many of households do not regularly visit nearest town or Bengaluru city. Some explanation to this may be in order. As the sample respondents are poultry entrepreneurs, their presence on the farm is very much necessary for undertaking timely operations for maintaining the birds, thereby they hardly have time to frequently visit nearest town / city. Besides it is the opinion of majority of the farmers that poultry industry has well established backward and forward linkages and all the facilities are made available to entrepreneurs at farm gate. This has reduced the number of visits they undertake to town / city.

Based on the value obtained for livelihood security index sample households are categorized into low, moderate and households with high index value. The mean score for various indicators for these three categories are presented in Table-7.

It may be noted from Table-7 that values of the indicators in respect of net income, land holdings with irrigation facility, education, social participation and cosmopolitanism differ among poultry farmers identified to have low, moderate and high livelihood security index. While the values other indicators appear to be similar for all three categories of farmers. Thus it may be inferred that development of overall community in terms of strengthening the common facilities and infrastructure like schools, primary health centres, and good drinking water and sanitation facilities helps in ensuring livelihood security of households. At the same time results reveal that endowments of individual households also have significant influence in attaining livelihood security at household level.

#### **Correlation Analysis:**

In order to know the factors which play more influence role in achieving the livelihood security of poultry farmers, a correlation coefficient was calculated between livelihood security index and indicators measuring livelihood security of households, viz., economic, educational, health, habitat,

size of poultry farm and community participation of households. The results are presented in Table-8. It may be noted from the Table-8 that both the variables considered to represent economic security and community participation of household has registered significant positive correlation with livelihood security index. The correlation coefficient has turned out to be statistically non-significant in respect of educational, health, habitat including the size of the poultry farm. Thus it may be concluded that good infrastructure and well established backward and forward linkage are the dominant factors to achieve livelihood security of poultry farmers.

#### **5. Conclusion**

The study indicates that the presence of strong institutions like private players in poultry industry like VHPL has provided required backward and forward linkages enabling sector to register high rate of growth. The sector has played a vital role improving the economic status of rural households, especially vulnerable section and has provide strength to livelihood security to farming families in the study area-Bengaluru region.

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**Table 1: Management Orientation of Poultry (broiler) Farmers of Bengaluru Region**

Sl. No	Selected indicators to measure management orientation of poultry (broiler) farmers	Mean score	Standard deviation	Expected score	
				Minimum	Maximum
1	Planning orientation	10.45	1.07	0	12
2	Production orientation	6.86	1.05	0	8
3	Marketing function	11.14	0.93	0	12
4	Attitude towards good management practices	15.98	0.18	0	16
5	Deferred gratification	30.50	3.40	0	40
6	Economic orientation	22.02	1.92	0	24
7	Achievement motivation	8.50	1.61	0	12
8	Innovativeness	12.18	0.76	0	18
9	Scientific orientation	9.95	0.30	0	10
10	Aspirations	18.70	0.63	13	21
11	Risk orientation	20.30	1.30	0	24
12	Training exposure	0.57	0.50	0	1
13	Extension participation	4.68	0.68	0	8
14	Farm scientists contact	4.73	0.59	2	6
15	Mass media participation	5.37	1.38	0	14

**Table 2: Factor loadings and Eigen values of first-five principal components constructed to derive composite management index ( CMI) for poultry (broiler) farmers of Bengaluru region of Karnataka**

Sl. NO	Indicators capturing management orientation	I-PC	II-PC	III-PC	IV-PC	V-PC
		<b>Factor loadings</b>				
1	Planning orientation	0.225	0.399	0.226	-	0.127
2	Production orientation	0.164	-	0.383	-	0.503
3	Marketing function	-	0.437	0.144	0.262	0.304
4	Attitude towards good management practices	-	0.232	-	0.608	0.201
5	Deferred gratification	0.391	0.275	-	-	0.156
6	Economic orientation	0.429	0.101	0.182	-	-
7	Achievement motivation	0.399	0.257		-	-
8	Innovativeness	-	0.279	0.176	0.546	0.150
9	Scientific orientation	-	0.317	0.348	0.119	0.227
10	Aspirations	0.210	0.141	0.480	-	-
11	Risk orientation	0.313	0.205	0.166	-	0.420
12	Training exposure	0.408	0.299	-	0.112	0.132
13	Extension participation	-	0.170	0.342	0.109	0.499
14	Farm scientists contact	0.266	0.212	0.423	0.117	-
15	Mass media participation	0.195	0.188	0.184	0.429	0.194
		<b>Eigen values</b>				
		0.24	0.16	0.12	0.09	0.08

**Table 3:** Mean value of Management Indicators of Poultry Entrepreneurs of Bangalore District of Karnataka having Low, Moderate and High Composite Management Index.

Sl.NO	Indicators capturing Management orientation	Composite Management Index categorized as						F-Value
		Low		Moderate		High		
		Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation	
1	Planning Orientation	9.69	1.25	10.39	0.78	11.31	0.48	11.01*
2	Production Orientation	6.46	1.05	6.78	1.06	7.38	0.87	2.85***
3	Marketing Function	10.92	1.26	11.00	0.77	11.54	0.66	1.81 NS
4	Attitude towards Good Management Practices	15.92	0.28	16.00	0.00	16.00	0.00	1.20 NS
5	Deferred Gratification	29.15	2.73	30.44	3.67	31.92	3.28	2.29 NS
6	Economic Orientation	20.46	1.71	22.39	1.69	23.08	1.50	9.01 *
7	Achievement Motivation	7.23	1.17	8.56	1.50	9.69	1.18	11.31*
8	Innovativeness	12.08	0.76	12.06	0.73	12.46	0.78	1.28 NS
9	Scientific Orientation	9.85	0.55	10.00	0.00	10.00	0.00	1.20 NS
10	Aspirations	18.31	0.63	18.83	0.62	18.92	0.49	4.28**
11	Risk Orientation	19.38	1.39	20.11	1.41	21.46	0.97	8.75*
12	Training Exposure	0.77	0.44	0.56	0.51	0.38	0.51	2.01 NS
13	Extension Participation	4.54	0.88	4.61	0.70	4.92	0.86	0.86 NS
14	Farm Scientists Contact	4.31	0.63	4.94	0.42	4.85	0.55	5.96*
15	Mass Media Participation	5.92	1.38	6.11	1.45	5.15	1.14	2.02 NS

Note: \* significant @ 1%, \*\* significant @ 5%, \*\*\* significant @ 10%, NS= Non-significant.

**Table 4:** Poultry (broiler) farmers based on Management Orientation Category

Sl.No	Category of farmers	Percentage of farmers	Number of farmers
1	Low management	30	13
2	Moderate management	40	18
3	High management	30	13
<b>Total</b>			<b>44</b>

**Table 5:** Variables considered for construction of livelihood Security of index of poultry (broiler) farmers of Bengaluru region of Karnataka

Sl. No.	Household security measures	Variables
1	Economic security	Net annual income of household
		Extent of land holding with irrigation
2	Educational security	Number of children attending school/ colleges.
		Education level of head of the household.
3	Habitat security	Type of house possessed by the house hold
4	Food security	Extent net income of households above / below the poverty line.
5	Health security	Health status of household members
		Sanitary facilities available at the house
6	Community participation	Social participation
		Cosmopolitiness
		Index was constructed by combining all the five indicators and converting them into standard normal variants and centring them on maximum score obtained.
7	Livelihood security	

**Table 6:** Household livelihood security index of poultry (broiler) farmers of Bengaluru region

Sl. No	Household security measures		Mean
1	Economic security		
	Net annual income of household	Rs lakhs	4.58
	Extent of land holding with irrigation	in acres	1.93
2	Educational security		
	Education level of head of the household.( graduation-2, highschool-1, primary-0)	average score	1.07
3	Habitat security		
	Type of house possessed by the house hold	status	moderate to pucca
4	Food security		
	Extent net income of households above / below the poverty line.	percent	70 to 80 %
5	Health security		
	Health status of household members	status	moderate to good
	Sanitary facilities available at the house	percent	100
6	Community participation		
	Social participation ( reglurly-2, occasinally-1 and never-0)	average	1.50
	Cosmopolitiness (visit to town- two or more times-5, once in a week-4, once in fifteen days-3, once in a month-2, seldom-1, never-0)	average	0.68

**Table 7:** Mean score of poultry (broiler) farmers of Bengaluru region classified based on livelihood security index

Sl. No	Household security measures		Low	Moderate	High
1	Economic security				
	Net annual income of household	Rs lakhs	3.30	4.73	5.80
	Extent of land holding with irrigation	In acres	1.40	1.60	2.90
2	Educational security				
	Education level of head of the household.( graduation-2, highschool-1, primary-0)	average score	0.73	0.93	1.60
3	Habitat security				
	Type of house possessed by the house hold	status	moderate to pucca	moderate to pucca	moderate to pucca
4	Food security				
	Extent net income of households above / below the poverty line.	percent	55 to 60	70 to 80	80 to 90
5	Health security				
	Health status of household members	status	moderate to good	moderate to good	moderate to good
	Sanitary facilities available at the house	percent	100	100	100
6	Community participation				
	Social participation ( reglurly-2, occasinally-1 and never-0)	average	0.40	0.86	1.80
	Cosmopolitaness (visit to town- two or more times-5, once in a week-4, once in fifteen days-3, once in a month-2, seldom-1, never-0)	average	0.40	1.06	0.86

**Table 8:** Correlation between livelihoods security of index(LSI) with variables of poultry (broiler) farmers of Bengaluru region of Karnataka

Sl.NO	Household security measures	Variables	Poultry farmers N=44
1	Economic security	Net annual income of household	0.66*
		Extent of land holding with irrigation	0.48*
2	Educational security	Education level of head of the household.	0.29NS
3	Health security	Toilet, electricity facilities and extent consumer durables possessed by the house hold	0.20 NS
4	Habitat security	House + shed for birds	-0.06 NS
5	Size poultry/	Batch Size / no. of birds	0.14NS
6	Community participation	Cosmopoltiness	0.58*

Note: \*Indicate statistical significance at 5 per cent level of significance. NS= non- significance