

A Study of the Perceived Effects of Climate Changes on Commercial Layer Egg Industry with Respect to Total Production, Egg Price Behavior, and Diseases among Layer Poultry Farmers at Namakkal District, Tamilnadu, India.

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ABSTRACT

This paper is aimed at understanding the impact of climate changes in layer egg production in the Namakkal district and also tries to assess climate changes opportunities for poultry farmers, climate changes challenges, adaptation suggestions and mitigating measures. To understand these impacts, eighty-three (83) poultry farmers were interviewed to elicit relevant information in line with the objectives of the study. Descriptive statistics tools were used for data analysis.

Findings revealed that majority (93.3%) of the respondents are aware of climate change, 78%, 98.8% and 86.7% of the respondents agreed that temperature fluctuation, increased in sunshine intensity and global warming has a negative effects on poultry production, 72.4% of the respondents agreed that prices of feed grains are usually high in hot and dry seasons which may affect cost of production and number of birds to raise for egg and meat production in the farm, 73.5% of the respondents agreed that climate change has effect on feed grain availability, this implies that high temperature and low rainfall are climatic factors that affect general grain harvest, their supply to the market and ultimately cost of poultry production. the findings further revealed that 94% of the respondents agreed that climate change affects egg and meat production pattern and 95.2% of the respondents agreed that moist climatic conditions encouraged the distribution and development of diseases.

(Keywords: poultry, layer farms, egg price, climate factors, poultry production)

INTRODUCTION

Poultry industry is one of the fastest growing segments of the agricultural sector in India. The important aspect of poultry development in India is the significant variation in the industry across different regions. The Namakkal poultry industry has been facing many constraints in poultry egg production due to climate factors, disease outbreaks, poor quality of chicks, lack of quality feed, bio-security, seasonal variations in egg prices and demand, poor infrastructure, and so on, which ultimately influences the prices of the eggs and its demand, and productivity of egg production.

Climate Changes and Poultry Industry

Poultry flocks are particularly vulnerable to climate change because birds can only tolerate narrow temperature ranges. Poultry farmers need to consider making adaptations now to help reduce cost, risk, and concern in the future, according to a report from the UK-based Farming Futures in its Climate Change series.

Under the ICAR Network Project on Climate Change, the impact of high ambient temperature on survivability and performance was evaluated. As the ambient temperature reached $\geq 34^{\circ}\text{C}$ the mortality due to heat stress was significantly high in heavy meat type chickens (8.4%) as compared to light layer type (0.84%) and native type (0.32%) chickens. Feed consumption decreased from 108.3 g/bird/day at 31.6°C to 68.9 g/bird/day at 37.9°C . The egg production also decreased both in broiler (by 7.5%) and layer (by 6.4%) breeders as compared to their standard egg production. The body temperature increased from 41 to 45°C as the shed temperature rose from 28 to 42°C and the critical body temperature at which the birds succumbed to death was 45°C ,

which was observed at the shed temperature of 42°C. Naked neck birds performed significantly better than the normal birds with respect to thermo tolerance, growth, feed efficiency and immunity at high temperatures (ICAR)¹.

METHODOLOGY

This study aims to find out the perception of the layer poultry farmers at Namakkal district about the effects of climate changes on commercial layer egg industry with respect to total production, egg price behavior and diseases. The present study also tries to understand the opportunity available to the poultry farmers, challenges that they face owing to climate changes, new measures that they have adopted in respect to the climate changes, and the mitigating measures to reduce the impact of climate changes.

For this purpose, this study used simple random sampling technique to identify a total of 83 poultry farms with at least 4 poultry from each of four Taluk namely Namakkal, Rasipuram, Tiruchengode, and Paramathi Velur. A well-structured interview schedule was used as primary source of data collection from the sampled poultry farmers. Data analysis was done using descriptive statistics such as frequencies distribution, and percentages to determine the perception of the respondents on effects of climate change on poultry production in the study area.

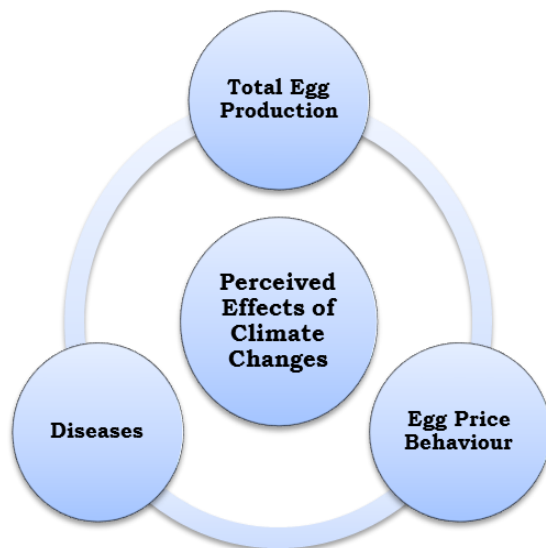


Figure 1: Conceptual Framework of this Study.

Poultry Industry in Namakkal at Different Seasons

The study was conducted Namakkal District which has made Tamil Nadu the country's second-largest egg producing center, Andhra Pradesh being the first. India is the third-largest chicken egg producing country in the world, next only to China and the US. (India produces around 75,000 million eggs a year).

About 80% of the layer farms in Tamil Nadu are concentrated in and around Namakkal. The region is a dry semi-arid zone, where agricultural operations cannot be carried out economically due to rocky soil and shortage of water. By dedicated hard work and entrepreneurship, the poultry farmers have successfully established a large poultry pocket in this area and Namakkal has come to be known as the 'poultry city'.

Poultry farming in Namakkal became serious business in the early 1970s when a farmer started out with a 100 layer chicken egg farm in a thatched poultry shed. A few farmers started preparing their own feed as well. The production took off in the early 1980s when the breeders started rearing poultry under tiled roofs. Many aspiring entrepreneurs rushed to set up layer farms. This resulted in many problems like overproduction, exploitation by traders, non-availability of superior hybrid layers, frequent disease outbreaks, lack of scientific knowledge in poultry rearing and quality feed preparation. But in spite of all the problems, climatic changes have severe impact on the production eggs Namakkal. This can be identified from Table 1.

The above table shows average level of egg production at Namakkal in the past three years since 2012. From the table it can be understood that the total production was stable during the winter season (December, January February and March). Similarly during summer (Pre-Monsoon) April, May and at the end of winter (March) the total egg production at Namakkal were very poor comparatively to the remaining seasons.

Season wise Average Egg Price at Namakkal³

Data on National Egg Coordination Committee (NECC) Namakkal, egg price for the three years from 2012-2014 was collected from the secondary sources and analyzed for understanding the trends of egg prices during this period.

Table 1: Average Level of Egg Production at Namakkal in the Past Three Years.²

Season	Month	Average Egg Production 2014	Average Egg Production 2013	Average Egg Production 2012
Winter	January	85%	89%	89.5%
	February	87%	88.5%	89%
	March	81%	84%	86%
Summer	April	82%	86%	87.5%
	May	80%	81.5%	83.5%
	June	85%	83.6%	86.6%
Rainy	July	84%	85.2%	87.2%
	August	87%	87%	89.2%
	September	87%	89%	90%
Autumn	October	87%	89%	89.6%
	November	85%	87%	88.8%
Winter	December	87%	86.5%	86.9%

Table 2: Seasonal Average Egg Price at Namakkal from 2012 to 2014.

Season	Duration	Average Egg Price (Price of Per Egg in Paisa)		
		2014	2013	2012
Winter	December-March	335	329.6	269.2
Summer (Pre-monsoon)	April-June	298.8	318.3	270.2
Rainy (Monsoon)	July-September	307.1	330.1	319
Autumn (Post-monsoon)	October-November	330.3	367.8	312.3

Table 3: Month wise Average Egg price from 2012 to 2014.

Month	Average Egg Price (Price of Per Egg in Paisa)		
	2014	2013	2012
January	343.87	336.9	284.58
February	319.82	365.86	261.66
March	294.94	310.16	261.39
April	258.13	296.67	230.33
May	314.52	289.45	269.45
June	323.83	368.9	310.83
July	316	334.68	290.03
August	282.26	323.55	311.03
September	323	332	356.07
October	306.68	345.84	314.52
November	353.83	389.77	309.17
December	348.1	381.16	305.29
Average	315.41	339.57	292.02

Centralized Moving Average Method was employed in this Time Series data and forecasting of egg price for 2014 was carried after putting factors for cyclical and seasonal trends. Considering the egg prices during this period,

mean annual price index for the three years were Rs.292.02, 339.57 and 315.41. Highest egg price was reported predominantly in the month of November and lowest in April.

Month Wise Average Egg Price⁴

The given table shows that the average egg price from 2012 to 2014 and it clearly indicates that the average egg price per egg during the months of January, February, May, June and July, November & December were around 3 rupees and more. As these months are the festival months of Tamilnadu the total demand would be more. Hence the demand determines the price of egg at Namakkal.

Namakkal Layer Poultry Farmers' Perceived Effects of Climate Change on Poultry Egg Production

The result in Table 4 shows that majority (94%) of the respondents agreed that climate change affects egg production pattern in the study area, in the same vein 78.4% of the respondents agreed that high temperature makes birds feed less and drink more water; this is because temperature reduces the feed intake of poultry birds and more energy is needed to conserve the heat caused by high temperature, hence, a decreased in the rate of feed intake which results to decrease in egg and meat production.

The perception of respondents on the effect of high temperature and low rainfall on quality of egg, more than half (67.5%) of the respondents agreed that these factors have a negative effect

on quality of egg in the study area. The Table further revealed that majority (86.8%) of the respondents agreed that high sunshine intensity affects poultry egg and meat production in the study area. High temperature and sunshine intensity many at times results to high mortality of the chickens, low egg production and low feed intake with low production.

Namakkal Layer Poultry Farmers' Perceived Effects of Climate Change on Poultry Disease Distribution

From the results in Table 5, majority (90.4%) of the respondents reported that climate change has effect on distribution of poultry diseases, close to three quarter (78.3%) of the respondents claimed that there are more poultry diseases than in the past as result of effect of climate change.

The results in Table 5 further revealed that majority (95.2%) of the respondents agreed that moist climatic conditions encouraged the distribution and development of diseases and 68.7% of the respondents also confirmed that climate change has led to the development of new poultry diseases in the study area. High rainfall and relative humidity provides a conducive environment for breeding of parasites that causes outbreak of diseases which invariably reduces egg and meat production.

Table 4: Distribution of Respondents on Perceived Effects of Climate Change on Poultry Egg Production.

Variables	Perceived Effects on Production Pattern			
	Strongly Agree (Frequency in %)	Agree (Frequency in %)	Strongly Disagree (Frequency in %)	Disagree (Frequency in %)
Climate change affects egg production	56 (67.5)	22 (26.5)	5 (6.0)	Nil
High temperature makes birds feed less and drink more water	33 (39.8)	32 (38.6)	7 (8.4)	11 (13.3)
High temperature and low rainfall leads to production of low quality egg	34 (41.0)	22 (26.5)	12 (14.5)	15 (18.1)
High sunshine affects egg production	54 (65.1)	18 (21.7)	18 (21.7)	11 (13.3)

Source: Primary Data

Table 5: Distribution of Respondents on Perceived Effects of Climate Change on Poultry Disease Distribution.

Particulars	Effects of Climate Change on Disease Distribution	
	Yes (Frequency in %)	No (Frequency in %)
Does climate change have effect on the distribution of poultry diseases?	75 (90.4)	8 (9.6)
Are there more poultry diseases now than in the past due climate change?	65 (78.3)	18 (21.7)
Moist climatic conditions encourage the distribution and development of diseases?	79 (95.2)	4 (4.8)
Has climate change led to the development of new poultry diseases?	57.9 (68.7)	26 (31.3)

Source: Primary Data

Summary of the Namakkal Layer Poultry Farmers' Opinion about Climate Changes⁵

A) Climate Change - An Opportunity for Poultry Farmers: Savings may be possible: winter energy costs may reduce as warmer winters reduce the need to heat buildings and flocks can be acclimatized outside. Locally grown soya and maize would cut feed costs and poultry 'food miles'. Furthermore, meat products may increase in price and this – combined with feed prices possibly decreasing (due to the potential for soy yield to increase by 10 per cent as a result of rising carbon dioxide levels (Amos, 2006)⁷ – may make poultry farming more profitable.

B) Climate Changes - A Challenge: The challenges posed by climate change fit broadly into one of two categories: loss of productivity or increasing costs. Regarding productivity, housing systems need to be managed to maintain optimal seasonal temperatures and reduce the risk of heat stress, and increased investment will be required in ventilation and cooling. Reproductive capacity may decrease. Studies by the Animal Husbandry Policy Note 2014 – 2015⁶ on broiler hens found that a poultry house put under a future climate change scenario exceeded critical temperature on 30 per cent more occasions despite a 10 per cent increase in ventilation. Furthermore, more dramatic events, such as storms, increase stress and may adversely affect productivity. Costs are likely to increase as the result of the need to cool buildings more in summer and reduce house humidity. Building infrastructure and maintenance will have to cope with more intense weather events and increased rainfall. This means that building plans need to consider more sustainable options, with greater investment in drainage

systems to accommodate more extreme and frequent floods and frequent rainfall. Stocking density in the house may need to be reduced in extreme temperatures, and actively controlled ventilation could become essential in transportation vehicles.

C) Climate Changes - Adaptation Suggestions: Poultry farmers suggested reconsidering building design in new builds to more effectively cope with new climate and weather extremes, including the installation of more/new equipment to cope with new climate extremes.

D) Climate Changes - Mitigating Measures: These include the installation of renewable energy – such as solar or wind power – to power poultry sheds, and using biomass boilers or anaerobic digestion of poultry litter. Although some of the impacts might happen to a greater or lesser extent in the short, medium or longer term, it is important to think ahead for the future, especially in relation to issues such as building design.

CONCLUSION

Poultry plays an important economic, nutritional, and socio-cultural role in the livelihood of rural households in many developing countries, including India. Poultry are birds which include chickens and eggs. which render not only economic services but contribute significantly to human food as a primary supplier of meat, egg, raw materials to industries (feathers, waste

products), source of income and employment to people compared to other domestic animals.

The study revealed that majority of the respondents are aware of the climate change and hence, most likely to make observation on how it affect poultry production pattern, effects of climate change which results in temperature fluctuation, increased in sunshine intensity and global warming has a negative effects on poultry production which many at times results to high mortality rate of the chickens, low egg and meat production and prices of feed grains are usually high in hot and dry seasons as result of effects of climate change which may affect cost of production and number of birds to raise for egg and meat production in the farm.

From the findings of the study, egg and meat production pattern are affected by climate change because periods of high temperature and sunshine intensity makes the birds to drink more water and reduce feed intake which many at times results to high mortality of the chickens, low egg production and low feed conversion ability of the birds to meat, hence, low meat production.

The study further revealed that climatic changes influence the emergence of new poultry diseases and increased its distribution. There is dire need to intensify awareness campaign to poultry farmers on how to reduce the effects of climate change on poultry production. Extension agents and other development agencies need to educate the poultry farmers more about the effects posed by climate change on poultry production.

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