Research Note: Indian poultry industry vis-à-vis coronavirus disease 2019: a situation analysis report

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ABSTRACT Originating in Wuhan city, Hubei province of China, and rapid spread to multiple countries, severe acute respiratory syndrome coronavirus 2 has emerged as a novel public health emergence. During early February, spread of misinformation and rumors driven by the fear of linking chicken meat and eggs in the transmission of coronavirus disease 2019 (COVID-19) among human population is witnessed in India. This resulted drastic reduction in consumption of poultry products with subsequent fall in demand thereby prices. The COVID-19-driven lockdown during March in the country has further accentuated the crippling poultry industry following the arrest of feed and healthcare essentials and destruction of eggs, chicks, and birds. Here, we have analyzed the impact of COVID-19 on the poultry industry and showed the realistic flow of events that resulted in its economic fallout by disruption of poultry protein chain during pandemic crisis. The projected loss caused because of these events for the Indian poultry industry is around USD 3053 million. The economic impact is not uniform across the country owing to regional differences in consumption pattern and percent non-vegetarians.

Key words: COVID-19, lockdown, economic impact, poultry industry, India

INTRODUCTION

Coronavirus disease 2019 (COVID-19) is a recently emerged infectious disease caused by severe acute respiratory syndrome coronavirus 2 that is the seventh member of the Coronaviridae known to infect humans (Andersen et al., 2020). Originating in Wuhan (China), this COVID-19 has created a pandemic crisis by claiming 0.97 million deaths with 31.66 million infections as on September 24, 2020, globally (WHO, 2020). In India, it resulted in 5.73 million infections with 1.58% fatalities which is the ever known to human race in the recent decades. The economic crisis arisen because of this pandemic-driven lockdown has impacted more than 40 million internal migrants in terms of livelihood loss (World Bank, 2020). Agriculture being India’s backbone of economy, the halt in harvest and transportation of the agricultural produce because of labor force ultimately resulted in disruption of supply chain, which in turn worsens the situation of poor community and farmers in India.

The poultry industry in India has made a remarkable growth ever since its inception and is presently emerging as a sunrise sector with a growth rate of 8.51 and 7.52% in egg and broiler production, respectively (BAHS, 2019), as against 2.9% for agricultural crops (Economic Survey, 2019–2020). Estimates from the All India Poultry Breeders Association indicates that poultry contributes for USD 17.31 billion of total India’s gross value and satisfies the hungers of 50 million people through direct and indirect employment. Within the poultry sector, broiler and layer segment constitutes about 65.3 and 34.7% with the monthly turnover of 400 million chicks and 8,400 million eggs, respectively (ICRA, 2020). Around 1 million farmers are engaged in poultry farming activities with 85% of them having less than 2 ha of land or the landless. With the annual production of 851.8 million birds, poultry in India has emerged as the most dynamic and diversified subsector. India is the third largest egg producing and fourth largest broiler producing country in the world with an estimated production of 103.3 billion eggs and 4.1 million tons of broiler meat (BAHS, 2019).

Over the last 1 yr, the industry is riding a tough wave witnessing the higher feed prices owing to lowered...
acreage in maize production followed by COVID-19 impact and lockdown. During the first week of February 2020, with just an unsubstantiated and fabricated message in social platform, the entire Indian poultry industry has become crippled with a false premise of chickens being a potential transmitter of severe acute respiratory syndrome coronavirus 2. Amidst COVID-19 scare, the consumption of chicken meat and eggs has dropped severely and subsequently the prices. The world’s biggest nationwide lockdown imposed in the country from March 25, 2020 to contain the virus spread has further accentuated the already COVID-19–hit chicken protein industry following the arrest of logistic supply that is restricted moment of feed, vaccines, medicines, and chicks. Considering aforementioned, we attempted to analyze the direct and indirect impact of COVID-19 and its associated lockdown on the domestic poultry industry in India.

MATERIALS AND METHODS

Data Collection

Primary data were collected from respondents (N = 65) representing different segments of the poultry industry through a short structured questionnaire, and relevant responses were recorded. Primary respondents were selected randomly from different locations to avoid biasness, and data were collected from January to May 2020 via personal voice calls and social media platforms. Commercial broiler, layer, and hatchery farmers were approached to assess the impact of pandemic disease on production cost of live broiler, table eggs, and chicks, respectively. Feed and chick dealers, broiler traders, egg vendors, and retail processors were also surveyed to ascertain the price trend in poultry products during the study period. Respondents were clearly informed about the intention of survey and obtained their consent before interviewing.

Data from secondary sources were collected to assess the egg price trend during the pandemic period. Prevailing egg prices pertaining to 5 different highest egg-producing regions, that is, East Godavari (Andhra Pradesh), Hyderabad (Telangana), Namakkal (Tamil Nadu), Pune (Maharashtra), and Kolkata (West Bengal) were retrieved from National Egg Coordination Committee database (http://www.e2necc.com/EGGDailyAndMonthlyPrices.aspx). Daily broiler prices from broiler belt regions Maharashtra, Tamil Nadu, Telangana, Andhra Pradesh, and Uttar Pradesh were retrieved from real-time market sources (poultry bazaar). Prevailing market prices of maize were retrieved from Agriwatch and Agricultural Marketing Intelligence Center, Hyderabad.

Data Processing

Daily prices were recorded and depicted mo wise. Egg and broiler prices were expressed as price per 100 eggs and kg live weight basis, respectively. Price conversion from Indian rupees to US dollar (USD) was performed as per Reserve Bank of India exchange rates (https://dbie.rbi.org.in/DBIE/dbie.rbi?site=home). % change in price trends and price index were calculated for eggs and broiler as per the following formula:

\[
\% \text{ change} = \left( \frac{\text{Price in the current month} - \text{Price in the previous month}}{\text{Price in the previous month}} \right) \times 100
\]

\[
\text{Price index} = \left( \frac{\text{Price in the current month}}{\text{Price in the baseline period}} \right) \times 100
\]

*December 2019 was considered as baseline period in our study.

Data Analysis

Descriptive statistics (1-way ANOVA) was used to analyze the collected data by using Statistical Package for the Social Sciences (IBM Corp. Released 2011. IBM SPSS Statistics for Windows, version 20.0; IBM, Armonk, NY), and means were compared using Duncan’s post hoc test at 5 and 1% level of significance. Similarly, Student t test was performed to study the differences in price trend between 2-year time points.

RESULTS AND DISCUSSION

Trend in Broiler Prices

The overall price trend of poultry egg and meat as obtained by this market survey in the major production and consumption areas is presented in Table 1. Results indicated that broiler is the severely hit segment than layer in the poultry industry with drastic fall in farm gate prices of live broilers. Broiler prices were markedly (P < 0.01) reduced in all the study locations with the January (USD 1.21) and March (USD 0.45) mo having highest and lowest values, respectively. Results pertaining to percentage change in price fluctuation showed a negative trend of 36, 43, 129, and 21.3 from January to February, February to March, March to April, and January to April, respectively. Price index is considered as viable economic indicator of any commodity, the monthly prices indices for live broiler revealed highest consumer demand and consumption pattern (P < 0.05) in January with gradual reduction in subsequent mo (till April).
Daily consumption of broiler meat in Tamil Nadu has dropped from 20 to 9 thousand tons per week during January to March, respectively. The lowest daily farm gate broiler prices were further step down from USD 0.41 to 0.11 during March to April, respectively. In April, the demand was further shrunken owing to 50% lesser consumption amid COVID-19 scare. Similarly, in Andhra Pradesh (country’s highest poultry producing state), the demand was reduced by 50% during March to April compared with January wherein 56 thousand tons production per week was observed. In Uttar Pradesh (India’s most populated state), the prices were USD 1.33, 0.8, 0.66, and 0.66 in January, February, March, and April, respectively (Table 1). Accordingly, daily production of broilers was reduced from 11 to 3 million. Holi, the “festival of colors” is one of the heavily celebrated festivals in India with a higher demand for chicken meat consumption. As indicated by prices, demand for broiler meat was significantly ($P < 0.01$) reduced by 58.82% in comparison with corresponding period of 2019. Karnataka witnessed a remarkable dip of more than 85% (from 700 to 85 million tons per day) of broiler meat and 50% of eggs (from 37 to 16 million eggs). Since early January, retail price of poultry in Karnataka has dropped from USD 0.67 to 0.10. Kerala, the southern part of India with 98% non-vegetarians (Indian Express 2016–epaper.newindianexpress.com/c/10946956) has witnessed a massive (60%) drop of poultry population.

In the broiler breeder industry, the average production cost of broiler chick remained higher than the sale price (Table 1) that led to disposal of hatching eggs and hatchlings due to piling of unsold inventory. One such situation is observed with the National Smallholder Poultry Development Trust, the largest poultry enterprise for Dalit and tribal women of the country, that has been earning a livelihood with a turnover of USD 67.3 million was severely compromised wherein the losses were USD 5.3 million in a span of 30 d (Kanitkar and Tushir, 2020).

### Trend in Egg Prices

Eggs in the country are offering a viable source of nutrient dense food where one-thirds of the world undernourished exists (Singh et al., 2019). India’s mid-day meal scheme is one of the world’s largest programmes designed to feed the growing school children and their inclusion in meals paved a better platform for fighting against malnutrition. Tamil Nadu is the only state to provide highest number of eggs per week which is 5 in schools and 3 in Anganwadis/rural child care centers (Kataria and Kolluri, 2017). Closure of schools in consequence to lockdown has drastically reduced the marketing demand for eggs in these regions.

Egg price provides an indirect estimation of supply demand situation in the market, and analyzing its trend in relation to time series provides an opportunity to mitigate with changing market (Yuhuan and Fu, 2018). Egg price and price index (Table 1) recorded a steep decline ($P < 0.01$) from January to March followed by a moderate increase in April in the surveyed regions. Altered consumption of eggs has resulted in retail price fall from USD 5 to 1 which is far lesser than National Egg Coordination Committee-proposed egg rates while the production cost was dwindling around USD 5. The lowest egg prices were recorded as USD 2.04 against the production cost of USD 5 (Table 1). On a relative note, south (East Godavari and Hyderabad) and east (Kolkata) bound regions have witnessed a drastic price fall from January indicating the consumer’s sensitivity to COVID-19 rumors. Percent change in price variation was recorded negative as 36, 43, 129, and 21.3 from January to February, February to March, March to April, and January to April, respectively. Namakkal, the largest egg producing hub in the country has realized a loss of USD 1.1 million from the stagnation of 190 million eggs. In this context, it is imperative to note that arrest in supply chain as a consequence of lockdown and avian influenza outbreaks in adjoining states that is Karnataka and Kerala (OIE, 2020) might probably have driven this scenario. Abolition of mid-day meal scheme owing to closure of schools in Tamil Nadu has further paralyzed the egg industry.

### Trend in Maize Prices

Maize being the major feed ingredient is maximum affected of among diversified poultry sectors. Despite the low production scenario of maize since 2019, the prevailing market prices have noted a marked reduction in conjunction with the 70% low operating capacity of poultry feed-manufacturing units. The realized market
prices for maize were far less than the low projected costs (Table 1) during the first quarter of 2020. As per National Commodity and Derivatives Exchange Data, Bihar, the highest maize producing region in the country has experienced a 40.9% price crash from December 2019 (USD 29.94) to April 2020 (USD 17.69) because of shrink (15 to 20% only) in demand.

Impact of COVID-19 and Its Consequent Lockdown on the Poultry Industry

The current situation is extremely unique for the Indian poultry industry with no previous experience. Even during the first avian influenza outbreak in 2006 February, only the western part of India was affected (OIE, 2006; as 4579) with the resultant loss of USD 29.9 million (Mohan et al., 2009) in the country, which is far less compared with the present situation. The estimated loss of the poultry industry due to impact of COVID-19 and its associated lockdown is USD 3053 million. Reports from Animal Husbandry Ministry indicated a projected loss of USD 203 million per d because of fall in demand by 30–40% and subsequently the prices from the start of February till beginning of the May. The first 2 wk of March itself accounted to a loss of USD 95 million. Maharashtra and Tamil Nadu itself peg losses of USD 95.25 and 108.9 million, respectively, in February. The broiler industry has observed to be the most affected than table eggs with an incurred loss of USD 1.08 billion per week owing to unmatching cost of production and marketing (Table 1). Furthermore, marketing of limited broilers (30–40%) that have been raised in the farms could not bridge their way to processing units as barricading of villages have become prominent and also the closure of 70 to 75% retail processing units in the country. In India, rural areas constitute maximum poultry production, whereas the urban area constitutes the maximum consumption (NAPEP, 2017). With the majority of urban areas being under “red zone” category (with higher number of COVID-19 cases), the transportation of poultry products has become completely compromised as a result of the lockdown imposed in these red zones. These events led to the forced culling and destruction of majority of live broilers in the country (Figure 1).

Is Future Predictable?

Chicken meat and egg consumption in India is highly unstable in connection with the involvement of taboos, festive occasions, purchasing power, and so on. Therefore, their prices are dynamic with high sensitivity to change in daily demand. COVID-19 pandemic–driven

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Figure 1. Flow of events involved in disruption of poultry protein chain during COVID-19 pandemic and its subsequent economic fallout in India. Abbreviations: COVID-19, coronavirus disease 2019; USD, US dollar.
economic crisis has adversely affected purchasing power of majority of the consumers in the country owing to the salary cuts and loss of employment. Live market sales of broiler meat constitute more than 90 to 95% pertaining to the preference for fresh cuts (NAPEP, 2017). Comparatively higher price index and lesser price variation in April (Table 1) suggest the phobia for broiler meat is plummeting. Thanks to the Ministry of Animal Husbandry Dairying and Fisheries, Government of India, for concerted efforts to aware the public in delinking chicken with COVID-19 transmission. The prices of broilers and eggs have recorded a steep increase in the May mo with the concurrent increase of consumption. Broiler prices were increased to USD 1.70 and the retail price of dressed meat of indigenous chicken has risen to USD 10.85, which is the mild sign of relief. Increased price of dressed meat of indigenous chicken has risen to May mo with the concurrent increase of consumption. Broiler meat constitute more than 90 to 95% pertaining to the economic crisis has adversely affected purchasing power of majority of the consumers in the country owing to the salary cuts and loss of employment. Live market sales of broiler meat constitute more than 90 to 95% pertaining to the preference for fresh cuts (NAPEP, 2017). Comparatively higher price index and lesser price variation in April (Table 1) suggest the phobia for broiler meat is plummeting. Thanks to the Ministry of Animal Husbandry Dairying and Fisheries, Government of India, for concerted efforts to aware the public in delinking chicken with COVID-19 transmission. The prices of broilers and eggs have recorded a steep increase in the May mo with the concurrent increase of consumption. Broiler prices were increased to USD 1.70 and the retail price of dressed meat of indigenous chicken has risen to USD 10.85, which is the mild sign of relief. Increased consumption and supply deficit might be the responsible factors for this hike in price. However, this may not suffice to recover the resultant loss to the industry as the household broiler consumption constitutes only 30 to 35%, while remaining large gap fills by the institutions, restaurants; public parties, and so on. Because the lockdown is expected to keep the restaurants, malls, tourism, and so on shut for the coming few mo, the consumption trend may not be restored to normalcy. Therefore, the broiler placements are expected to be around 30 to 35% of the total business volume by the small farmers to reduce further losses. Egg price also witness a catch up growth from USD 1 to 7. As already indicated, the resultant COVID-19 loss in the egg industry was less realized than broiler counterparts. It is presumed that cold storage of eggs during lean market season and recommendation of eggs in diet of COVID-19 special diet (WHO, 2020) for hospitalized and quarantined individuals during mid-April indicates a ray of hope in coming wk. Forecast of good monsoon (IMD, 2020) coupled with the availability of migratory laborers in rural areas anticipated to regain the crippled poultry industry in the country.

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**DISCLOSURES**

The authors declare no conflicts of interest.

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