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Food industry: A victim of recurrent pandemics

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Abstract

In 21st century, to satiate the requirement of ever growing population, food of animal origin has contributed immensely. Meat, Fish, Eggs and Milk have become indispensable part of the diet of people all over the world. As demand grew, organised industries developed in animal-derived food sector. This sector, apart from supplying the calorie and nutritional needs to the people, also shouldered the responsibility of social and economic amelioration of a class of people engaged in this business. Of late a recurrent streak of Zoonotic diseases has caused havoc in this sector, diminishing demand, over-capacity and more importantly, denting peoples' trust. The ongoing Covid-19 pandemic and lockdowns imposed almost all over the world have posed an existential crisis for the food industry. To overcome this challenge, new strategies have to be designed to provide qualitatively superior and hygienic food in sufficient quantities to regain the faith of people.

Keywords: Covid-19, nutritional needs, food industry, zoonotic diseases, economic losses, trust

Introduction

Since the beginning of 21st century, we are witnessing a heavy range of zoonotic diseases, many amongst them are emerging and many are re-emerging too. All of them have taken a fair share of toll in disrupting lives and livelihoods spreading over a large area affecting animals and humans alike. In such situations what faces the threat and heavy losses is an Industry. Either facts or sometimes the speculations and rumors about the threats dent industries that ultimately hit the brand values. In such times people become more cautious about the food they consume. Food industries come under extreme pressure to ensure supply of hygienic food products. The product again has to pass various tests for quality assurance. The food produced should be in sufficient quantities to meet the hunger and nutritional requirements of people. But outbreaks of diseases prompt people to think whether to eat outside food or not. Lockdown-like situations restrict the public to have an access to dine in or to take away. This pushes the business go down and ultimately causes long term effects on food industry. Diminished confidence of consumers hits brand values. This later becomes a major challenge to cope up.

Food is the basic need and necessity to support life. The pattern of food consumption across the world is transforming rapidly. People are getting attracted towards the food products of animal origin. At some places it is rather a need to rely on non-vegetarian diet, as the land is not productive, what so ever the reason is. Sample registration system baseline survey says that an average of 71% population in India is non-vegetarian (SRS, 2014) [44].

NDTV in one of their article says that a non-vegetarian diet has several health benefits because this type of food is rich in protein and vitamin B. Non-vegetarian food strengthens our muscles and helps them grow faster. It also helps to maintain body stamina and haemoglobin. On the other hand, lacto-ovo vegetarian food includes eggs and dairy products like milk, butter, cheese and so on (NDTV, 2018) [34]. Milk is considered as the nature's most complete food (Park, 2009) [40]. Milk and dairy products are nutrient-rich foods, supplying energy and proteins with a range of essential micronutrients like calcium, magnesium, potassium, zinc, and phosphorus (Bechthold *et al.*, 2019) [2]. Eggs are also considered to support the nutritional needs of human societies all over the world due to its potential benefits of supplying micronutrients, antioxidants, antimicrobials (Miranda *et al.*, 2015) [31]. Meat may be chicken, mutton, beef, pork, veal, venison, fish, insects, ducks, turkeys or any animal tissue used as food. It also contributes proteins, minerals, vitamins, fats, various hormones and medicines to the human body.

The portion of this livestock originated food to food industries largely comes from rural and peri-urban areas, where animal rearing along with agriculture is widely prevalent (FAO, 2020a) [13].

Of late, it has been time and again observed that animal originated food industry has been at the receiving end of shocks of successive pandemics of zoonotic diseases. Zoonotic diseases are the diseases that can be transmitted from animal to man or vice versa. Since the beginning of 21st century, we are witnessing the emergence and re-emergence of multiple zoonotic diseases, caused mainly by bacteria, viruses, parasites, fungi, prions or spirochetes (Table 01). Some might be novel to us and we might not have the immunity against these. Malaria, Dengue, Chikungunya, Indian cholera epidemic, Gujarath hepatitis, Odisha jaundice, Swine flu, Zika virus, Gorakhpur Japanese Encephalitis, Nipah virus and the recent outbreak of Corona virus or COVID-19 each of them has taken and is taking fair share of toll on food industry.

The Coronavirus is the most dangerous viruses that affects humans and causes devastating losses to mankind, belonging to the Coronaviridae family, subfamily Orthocoronavirinae (Yang and Leibowitz, 2020) [59].

Reasons for such epidemics

An "epidemic" is a Greek word where 'epi' means "upon or above" and 'demos' means "people". Thus epidemic is the rapid spread of disease to a large number of people in a given population within a short period of time (CDC, 2012) [10]. The focus of epidemiology is to study the occurrence and determinants of disease. Measuring the frequency of a disease or other health outcome in a population and identifying how the disease frequency may differ over time or among subgroups. These are important steps in discovering potential causes of a disease and determining effective methods for prevention and care (Noordzij *et al.*, 2010) [36]. We have seen the major three pandemics since 2000, severe acute respiratory syndrome (SARS) in 2003, H1N1 (Swine flu) in 2009 and now the COVID-19 (Chandra, 2020) [8].

The reasons for such occurrence and sometimes recurrence of disease are diverse. It did not happen by sheer coincidences. The time is here to study "why and how" this is happening. Disease outbreaks are usually caused by an infection, transmitted through person-to-person contact, animal-to-person contact, or from the environment or other media. Outbreaks may also occur following exposure to chemicals or to radioactive materials like Minamata disease (Yorifuji, 2020) [58].

First and foremost is the animal rearing system, a decentralized nature of rearing is adopted in India. 'All at once' phenomenon for mass immunization or medication is not possible in such cases. The practice exposes animals to contact with wild species responsible for infection. Intensive animal farms usually at bigger industries keep the animals very close to each other. Bird flu and swine flu both have their origin in intensive animal farms.

Environmental destruction is yet another reason. Deforestation causes loss of habitat of wild animals leading to spill over of zoonotic diseases in to human populace. Environmental destruction is rampant to create space for housing, agriculture and infrastructure. Once their habitats are destroyed, they often flock into the cities, where they can easily find food in human trash. These animals of course bring all their diseases with them responsible to spread it to

the domestic animals or the human beings coming in contact with (Sommer, 2020) [43].

Cultural practices, the practice of eating exotic wildlife, sometimes raw spreads novel pathogens to humans. Both SARS and COVID have their origin in wildlife market of China. Human population dynamics, Mobility, Changes in insect or reservoir populations, weather and climate changes, technology, mutations in genetics make up of viruses themselves, and many more.

Over population, cities around the globe continue to grow and people live closely together, sharing spaces all the time. Many times infrastructure and food safety precautions cannot keep up with this growth. So, markets without basic sanitary precautions formed, where vendors sell wildlife without control, often still alive. These markets are often linked to the outbreak of animal-borne diseases (Sommer, 2020) [43].

Impact of COVID-19:

The first murmurs of COVID-19 were heard in December 2019. At that point, no one would have imagined that a disease having its epicenter in a province of China would have the entire world in a death grip. But it had to be this way (Business Today, 2020) [4].

Corona virus is a highly fatal demon, devastating lives and livelihoods in not less than 227 countries and territories including India (John Hopkins University, 2020) [27]. Besides this, the virus is posing us the threats related to public health system and economies over the world. A complex global collective adding value in India's accelerated economic growth is food industry. If this continues to happen, the day is not far when we stare at a food crisis.

COVID-19 pandemic is showing its far-reaching impacts. Beyond its medical impact, it is also adversely affecting theatres like political, cultural, economic and social, aviation, cinema, domestic violence, hospitals, education, transport, religion, cultural heritage and what not. Food industry is one of the major victims amongst. COVID-19 pandemic affected global food industry as governments closed down restaurants, bars to counter spread of disease by breaking its chain.

People are buying products in fewer quantities, causing losses and threats to industries. Information broadcasted in the news that incorrectly link the spread of COVID-19 to chickens have cost the Indian poultry market over ₹1.6 billion a day.

Mahesh Chander, the principal scientist, agricultural extension and joint director ICAR-IVRI institute in his article to agrilinks says that India is world's fourth-largest chicken producer which is now facing its worst crisis in a decade. With temples closed, weddings postponed, and other ceremonies and celebrations stopped, the Indian fresh flower industry is also in crisis (Chander, 2020) [7].

There is no evidence that food or water or food packaging is a likely source or route of transmission for COVID-19 (WHO-FAO, 2020) [54]. Still the outbreak has magnified the critical importance of safe food among people. The governments have called for a lockdown which led to collapse in demand of perishable goods like food. This caused a ripple effect on liquor, wine, beer, food beverages and also on fishing and farming (Zanthe, 2020) [62].

About the lockdown impact due to various pandemics, in present context the COVID-19, on every sector is studied Maria Nicola and her co-workers and categorized the bereaved sectors in primary, secondary and tertiary categories based on threats they faced. Primary sector includes industries involved in the extraction of raw materials like agricultural, petroleum and oils, secondary involved in the production of

finished products like various goods manufacturing industries and the tertiary sector including all service provision industries like education, finance industry, health care and pharmaceutical industry (Nicola *et al.*, 2020) [33].

Such outbreaks diminish the confidence of consumers hitting brand values of renounced industries too. This ultimately becomes major challenge to get people fearless to buy their product.

In such times every one becomes more cautious about the outside food thus food industries comes are under extreme pressure to ensure supply of hygienic animal originated food products which pass the test of quality in sufficient quantities to meet the hunger and nutritional requirements of people. It then becomes a critical component to interact and understand their requirements to sustain a steady expansion.

Here are some economic reports from various sectors

Milk industry

Milk is considered as a complete food (Iftikhar, 2020) [24]. It is highly perishable because it is an excellent medium for the growth of microorganism (FAO, 2020b) [14]. Corona virus outbreak forced people to stay at homes this driven gallons of milk go down the drain (India Today, 2020) [22]. As hotels, restaurants, sweet marts and the unorganized tea stalls remained shut across the nation the milk consumption fell by 25-30% during April and May 2020 (Financial Express, 2020) [16]. The Rs 100,000 crore Indian dairy industries have suffered a 25-30 per cent dip in demand ever since the country shut down for the COVID-19 lockdown over two weeks ago. While the first two days did witness a 15-20 percent surge in demand with consumers hoarding milk, there has been consistent fall in demand from the third day onwards. A large portion of the dip in demand is due to out-of-home consumption, which contributes 15 percent of the milk consumption, coming to a grinding halt. (Shashidhar, 2020) [42].

Ajita Shashidhar in her article to Business Today says that Rs.100,000 crore Indian dairy industry has suffered a 25-30 percent dip in demand ever since the country shut down for the COVID-19 lockdown. 15 percent of dairy industry revenue comes from out of home sales, which have completely come to a halt. Dairies are procuring more in order to help farmers, hence, surplus milk dip in procurement prices. Skimmed milk powder prices hits a low of Rs 230 per kg with slackening global demand (Shashidhar, 2020) [42].

Meat and sea food industries

Meat is a nutrient dense food providing important amounts of protein, essential amino acids, vitamins, and minerals that are the most common nutrient shortages in the world, including vitamin A, iron, and zinc (Oxford Academic, 2018) [37]. India produces around 5.3 million MT of Meat and 75 billion eggs annually. India is the largest producer of buffalo meat and 2nd largest producer of goat meat (Ministry of Food Processing Industry, 2020) [30]. India's buffalo meat exports have taken a massive hit due to the Coronavirus outbreak, with exports falling nearly 50% to around 50,000 ton in last one month and this is the cut down demand for buffalo meat by half (The Economic Times, 2020) [45].

The resultant impact is chicken prices have crashed to 30 to 40 rupees/kg when the production cost for the farmer is 70/kg. Overall demand has come down by 70% and consumption has moved from chicken to mutton and seafood (Business World, 2020) [6].

Poultry industry

Poultry is the most organized of all animal agriculture sectors in India. It contributes almost Rs. 1.30 lakh crore directly to the country's GDP. The industry supports over 25 million farmers and employs over five million directly and indirectly in allied fields - poultry production, trading, feed manufacturing, agriculture crops, logistics, poultry-based products vitamins, minerals and pharmaceuticals, exports, etc (Business Today, 2020) [4].

First estimates are that India's poultry industry has been losing US\$ 1.5 million a day due to lower prices since early January. More than 25 million farmers earn their income in some form of poultry business in India. The Indian poultry sector produces about 4 billion broilers and 93 billion eggs a year and has been growing at between 6-8% per annum. However, the recent crisis has severely destabilized the sector (Poultry World, 2020, Pandey, 2020) [41, 39]. The Union animal husbandry ministry recently said the poultry industry had suffered ₹13,000 crore losses over the past month and the number was rising due to misconceptions that Sars-Cov-2 virus was being transmitted through consumption of eggs and chicken (Hindustan Times, 2020) [18]. In January 2020, ex-farm broiler rates in Maharashtra, at Rs. 75.56 per kg, averaged higher than the Rs. 72.97 for the same month of last year (The Indian Express, 2020) [48].

Eggs industries

Egg is one of the most perishable commodities. It is a conventional food containing nutrients that play fundamental roles beyond basic nutrition, their promotion as functional foods should be considered (Miranda, 2015) [31]. The shelf life of an unrefrigerated egg is just 7 to 10 days, so it has to get marketed within stipulated time otherwise it will get stale and disposing of the eggs will itself be a great problem (Times of India, 2020) [50]. The recent Covid-19 lockdown has impacted the domestic poultry industry severely with Q4 FY2020 being the worst quarter in recent time (The Economic Times, 2020) [45]. Whereas E Kumar Sharma says as an industry, the weekly loss today is to the tune of around Rs 200 crore from fall in egg and Rs. 900 crore on account of lower prices of birds and reduced sales (Business Today, 2020) [4]. Poultry revival begins but industry faces doom with Rs. 30,000 crore losses this year (The Print, 2020) [49].

Tallow industries

Tallow is a rendered form of beef or mutton fat, used as feedstock by the bio-diesel industry during the winter. Animal fat is a by-product of the meat industry. After the outbreak of Coronavirus, the plants started running at only 30-40 per cent capacity (Business Standard, 2020) [5].

Food security

Food security is the availability at all times of adequate, nourishing, diverse, balanced and moderate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices (FAO, 2003) [12]. Consumption of safe and nutritious food induce our body immunity, and our body can combat against different diseases even COVID-19 as a food safety ground. This is a significant factor for maintaining good health (Uddin *et al.*, 2020) [52]. Although WHO, FAO and US-FDA suggest that consumption of contaminated food is not the way of transmission of COVID-19, but there have been a lot of chances of getting infection by other food borne

pathogens like *Salmonella* and *Campylobacter* (FDA, 2020; Cloeckaert, 2006; Humphrey, 2007) [15, 9, 20].

The primary risks to food security are at the country level: as the corona virus crisis unfolds, disruptions in domestic food supply chains, other shocks affecting food production, and loss of incomes and remittances are creating strong tensions and food security risks in many countries including India (World Bank, 2020) [56]. The impacts of COVID-19 are not difficult to visualize in this context. Interruption of livelihoods of communities, breaking food supply chains, restricted access to market and health care units, this will directly or indirectly influence the food security (IFPRI, 2020) [25]. Food industry, has to deal with the food of animal origin right from its production, harvesting, transport, storage, processing, marketing and consumption, where by accident or intent they are vulnerable to contamination and this epidemic complicated the whole food supply chain from farm to table including food processing, supply and discharge, and consumption where people are engaged in different segments of supply chain, for example, agricultural inputs suppliers, farmers, food processors, wholesaler and vendors, transportation, and different organizations remain under hurdle (Galanakis, 2020) [17].

The impact on food security will have long lasting effects on the whole strata of food supply chains namely producers, suppliers, middle men, sellers and finally the consumers (Hobbs, 2020) [21].

Almost all the countries exposed to COVID-19 are under strict lockdown situation. People are forced to be in a confinement zone since last week of March 2020 that has had impact on global food security as there are restrictions for dining in and also to take away (Galanakis, 2020; Business Insider, 2020) [17, 3].

The WHO has declared the COVID-19 outbreak as the sixth public health emergency of international concern on 30 January 2020, followed by Ebola in the Democratic Republic

of Congo in 2019, Zika in 2016, Ebola in West Africa in 2014, polio in 2014 and H1N1 in 2009. Therefore, there has been an urgent need among the health workers, governments and the public to work together globally on timely basis to prevent its spread (Yoo, 2020) [60].

How to deal with it

FAO and WHO has published an interim guidance for food businesses on 7th of April of year 2020, where they say that even though it is highly unlikely that people can contract COVID-19 from food or food packaging's as it is basically a respiratory illness and the primary root of transmission is person-to-person contact and through direct contact with respiratory droplets generated when an infected person coughs or sneezes (WHO-FAO, 2020; The Financial Express, 2020) [54, 47].

The synopsis for the Guidry by WHO-FAO

Food workers: preventing the spread of COVID-19 in the work environment:

Staff working in food premises should be provided with written instructions and training on how to prevent the spread of COVID-19. Infected workers are excluded from food premises. Staffs that are unwell or have symptoms of COVID-19 should not be at work and should be informed about how to contact medical professionals. This is imperative because if an infected worker handles food it is possible that they could introduce virus to the food they are working on, or onto surfaces within the food business, by coughing and sneezing, or through hand contact. In addition, in some cases, infected people may be asymptomatic or pre-symptomatic and may not display any signs or symptoms of disease or may present with mild symptoms that are easily overlooked (Yu *et al.*, 2020; Huang *et al.*, 2020; Pan *et al.*, 2020; Tong *et al.*, 2020; Wei *et al.*, 2020; Kimball, 2020) [61, 19, 38, 51, 53, 28].

Table 1: Diseases with their years of epidemics

Sr. No.	Diseases	Year of Epidemics	References
1	Malaria	2006	(MedIndia, 2017) [32]
2	Dengue	2006	(News medical, 2009) [35]
3	Chikungunya	2006	(WHO, 2006) [55]
4	India Cholera Epidemic	2007	(BBC News, 2007) [1]
5	Gujrat hepatitis	2009	(NDTV, 2018) [34]
6	Odisha Jaundice	2014-15	(Deccan Herald, 2015) [11]
7	Swine flu	2015	(Indian Express, 2015) [26]
8	Zika Virus	2015-16	(World Wide Outbreak, 2016) [57]
9	Gorakhpur Japanese Encephalitis	2017	(India TV News, 2019) [23]
10	Nipah Virus	2018	(The News Minute, 2020) [46]
11	COVID-19	2019-present	(Lu <i>et al.</i> , 2020) [29]

Conclusion

So, we have to now co-exist with such pandemics, and discover ways to share space with them while minimizing the damage they cause to normal life. Such zoonotic diseases were, are and will be around us in future also. We have to live as good a life as we can in such situation. These diseases have shown that there is no non-entity. A minute particle, not even visible by microscope can ruin lives. Many amongst the outbreaks were well known to us but still their re-emergence again created havoc. So, there is every possibility that there are many more headline-grabbing diseases in the world today that are reaching at an epidemic or pandemic level. As the human is continuing to capture and encroaching wild spaces,

the disease outbreaks will take place for sure.

With the desire of achieving or discovering new things are we ignoring the potential of these tiny demons??

Extension services like education and training to the workers, laborers, personnel involved in animal rearing as well as animal originated food production and processing is the need of the hour. This can be done by providing guidelines on programs like mass vaccination, creating awareness about various zoonotic diseases along with their tentative diagnosis, associated risks and measures to prevent them and reporting to veterinary or medical officers specially in case of notifiable diseases. A change in the attitude only can bring success in the final product.

In today's globalised world, no country, so also, no industry is immune from the good or bad happenings taking place in rest of the world. With business linkages transcending national borders, all the countries need to act in tandem to deal with any problem. The rapid spread of COVID -19 across the whole world and resultant industrial shock also affecting all industries in all the countries has once again demonstrated the global scale of recent economic crises. It is thus high time that nations come on the discussion table and device common minimum standards of operation in respect of sectoral industries that will help prevent such setbacks to them as the one witnessed now owing to COVID -19 !

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