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Exploring the Possibility of a Firecracker Free India

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Abstract

This paper analyses the potential possibility of creating a firecracker-less India. With the looming threat and damage caused by the global Covid19 pandemic and the mere fact that 14 out of the 15 most polluted cities in the world are a part of our nation, taking swift and forceful action against air pollution is the need of the hour.

To give credit where it is due, we saw the heads of our country, more specifically the National Green Tribunal impose a complete ban on the sale and use of firecrackers in NCR from midnight of November 9, 2020, till midnight of November 30, 2020, and also order for a similar ban for all the cities where the air quality was at level "poor" or below. Moreover, there was also great emphasis laid on the use of "green crackers" to reduce the overall level of pollutants during major festivals like Diwali, Christmas, New Year etc. But are these temporary bans truly effective and are they a sustainable decision with regards to the falling air quality in India? And what would be the negative consequences and challenges of a complete ban on the sale and production of firecrackers in India?

To answer these questions, the author conducts a comparative analysis between a partial and full ban on the production and sale of firecrackers, discussing the advantages and disadvantages of both, after explaining in detail the production process, history and current scenario of firecracker production in India. To further strengthen the importance of this issue, a case study of Sivakasi, the firecracker capital of India has also been analysed.

Keywords: *firecrackers, air pollution, air quality index, ban*

1.0 Introduction

With pollution in Indian cities among the worst in the world, the government has come under pressure to do something about the nation's toxic air – a problem that becomes more acute during Diwali due to the toxic fumes emitted when celebratory fireworks are set off. This Diwali, for instance, many areas in New Delhi recorded an Air Quality Index (AQI) of 999, the highest possible reading (the recommended limit is 60). With the current situation of the rising cases of the COVID-19 pandemic, it was pertinent that necessary steps be taken to make sure that the air quality does not worsen further. (Business Insider India, 2019).

To tackle this the National Green Tribunal imposed a complete ban on the sale and use of firecrackers in NCR from midnight of November 9, 2020, till midnight of November 30, 2020. The NGT also ordered a similar ban for all the cities where the air quality was at a level "poor" or below. They also specified that in all the cities and towns where air quality is at "moderate" or below, only 'green crackers' are permitted to be sold and the timing to burst these crackers is to be restricted to 2-3 hours during festivals like Diwali, Christmas, Chhath pooja etc. But this was only a temporary ban, the likes of which the country has seen on many occasions before the year 2020. Even though the reasons for the ban were positive and its implementation necessary, the action has caused immense damage to the Rs 6000 crore industry that employs over 5000 families either directly or indirectly. The industry may be looking at losses of over Rs 800 crore this year alone, which threatens the livelihood prospects of 8 lakh workers. The demand for firecrackers has reduced by 35%.

It is obvious from the above information that any decision regarding the matter will have profound pros and cons. Considering this, the author, through this research paper, wishes to explore the possibility of declaring a complete ban on the production and sale of firecrackers in India and the subsequent gains and consequences of the action.

With this research paper, the author's main intent is to explore the viability of a complete ban on firecrackers in India.

2.0 The production process of firecrackers

Firecrackers are rolled paper tubes filled with gunpowder (75% potassium nitrate, 15% charcoal and 10% sulphur) (Economic Times, 2018). They might also be filled with flash paper and a fuse. When you light the fuse of a firecracker, the fire burns along the fuse and eventually reaches the powder. When it does, the firecracker explodes. (How Are Fireworks Made? 2019)

An aerial shell is made of gunpowder, which is a well-known explosive, and small globs of explosive materials called stars. The stars give fireworks their colour when they explode. When we watch fireworks, we see the explosion of the stars. They are formed into spheres, cubes, or cylinders that are usually 3–4 centimetres in diameter. Each star contains four chemical ingredients: an oxidizing agent, a fuel, a metal-containing colourant, and a binder.

In the presence of a flame or a spark, the oxidizing agent and the fuel are involved in chemical reactions that create intense heat and gas. The metal-containing colourant produces the colour, and the binder holds together the oxidizing agent, fuel, and colourants. At the centre of the shell is a bursting charge with a fuse on top. Igniting the fuse with a flame or a spark triggers the explosion of the bursting charge and the entire aerial shell.

3.0 History of firecracker production in India

Gunpowder and its use in fireworks first began in the 10th century in China and was called the "devil's distillate" and was brought to India and Europe from China by the Arabs. It is mused that Chinese pyrotechnic formulas were brought to India around 1400 AD and then modified with the use of Indian substitutes for the Chinese ones not available in India.

Fireworks and pyrotechnic shows existed as a form of royal entertainment in many medieval Indian kingdoms during festivals, events and special occasions like weddings and one of the earliest notes of pyrotechnical shows in India is made by Abdur Razzaq, the ambassador of the Timurid Sultan Shahrukh to the court of the Vijayanagar's King Devaraya II in 1443.

By the eighteenth century, fireworks began to be used in grand scale Diwali entertainments organised by rulers. With the coming of the British East India Company, the knowledge about different types of firecrackers was widespread and usually, the makers of firecrackers also produced gunpowder for warfare. However, its military use was phased out in favour of newer explosives like Dynamite. The first fireworks factory in India was set up in Kolkata in the nineteenth century. After Independence, Sivakasi in Tamil Nadu emerged as India's Firecracker hub, a title the state holds to date. (Rathi, 2020).

4.0 Current scenario of firecracker production in India

India currently holds the position of the world's second-largest producer of fireworks, the first being China. This is due to the country's large human resource and the plentiful availability of core components. With the increase in the population and economic growth of the Indian middle class and with ready supply coming in from domestic industry, production and sale of firecrackers only increased tremendously. But as most of the steps in the production process are manual, the workers face harsh threats to their health and well being.

Some of the human errors which lead to accidents in firework production are:

1. Rough handling of chemicals
2. Overloading of chemicals during the filling process.
3. Unsafe disposal of unused chemicals
4. Drying of crackers in the ground
5. Usage of banned chemicals such as potassium chlorate
6. Manufacture of unauthorized crackers
7. Usage of plastic sheets
8. Obstructions for free movement of workers and transportation of chemicals

(A & R, 2013, p. 763)

Even though the Factories Act 1948 gives guidelines for safety in the fireworks industries, it's mostly ignored to increase output, to an extent where young children are employed and tasked with hard labour, earning them wages way below the minimum level.

Unsafe working conditions and improper handling of inflammable raw materials continue to endanger lives in the fireworks industry. In mid-March 2020, 11 workers were charred at a fireworks unit in Tamil Nadu's Virudhunagar district while testing a type of firecracker that the factory did not have a permit to produce. Police data show that in the past decade, at least 239 people have perished and over 265 injured in 142 accidents in fireworks units.

The manufacturing of firecrackers in makeshift unlicensed units, rough handling of chemicals by untrained and unskilled workers, spillage or overloading of chemicals during the filling process, and working outside permitted areas have been identified as major causes for past accidents.

Crackdowns against violators have been few and far between despite illegal sub-leasing of works to unlicensed cottage units becoming a widely acknowledged practice in the industry. The probability of such mishaps can only be reduced by adopting safe work practices, complying with rules and through cohesive monitoring by Central and State licensing and enforcement authorities.

5.0 Comparative analysis- partial and complete ban on firecrackers

Due to the ever-present dangers of covid 19 and the deteriorating conditions of the air quality in our country, the supreme court called for a ban on firecrackers during major festivals. There was either a complete ban in covid hotspots like Delhi, Maharashtra, West Bengal etc or a partial ban with permission to use green crackers for a certain period in other states.

Here the author wishes to compare the fruitfulness, effectiveness and disadvantages of a partial ban on firecrackers to a complete ban.

5.1 Partial Ban

Advantages of a partial ban:

1. The weeks after Diwali or any major festival that encourages the use of firecrackers is just as hazardous as the day of the festivity. Thus a partial ban ensures that the air quality doesn't worsen, especially in cities with the already terrible quality of air.
2. Allowing the use of "green firecrackers" might reduce the noise and air pollution and also make the crackers less expensive since the production cost of these is cheaper. The Supreme Court banned firecrackers with aluminium, barium, potassium nitrate and carbon present in them. Green firecrackers need to have 30-35% lower emission of particulate matter (PM10 and PM2.5) and 35-40% lower emission of sulphur dioxide (SO2) and nitrogen oxide.

Unfortunately in this situation, there are more **disadvantages** than advantages.

1. The ban is only on the sale of firecrackers and not its use. Hence people who've already bought fireworks before the ban are allowed to burn them. Thus it reduces the effectiveness of the ban.
2. Moreover, the industry has already produced a large stock of the firecracker that will now need to be disposed of. Thus a huge quantity of resources are being wasted and its disposal will lead to the creation of immense physical waste and other kinds of pollutants.
3. As the stocks can't be sold anymore the producers face huge losses that could result in their businesses going under, negatively affecting hundreds of families dependent on the firecracker industry for their livelihood.

4. Most of the "green crackers", which have been permitted to be used cannot even be classified as "green". For products to be green, SC banned the use of Barium in firecrackers. "Only about 20% of the products manufactured this year don't have barium," says P. Ganesan, president of the Tamil Nadu Fireworks and Amorces Manufacturers Association (Tanfama). (Khandekar, 2020)
5. A partial ban could lead to feelings of religious suppression. Diwali is a major Hindu festival and firecrackers are a crucial part of the festivities. If a ban is only imposed during this one festival then the people of the respective community may feel alienated and even vengeful of their religious freedom being interfered with.

5.2 Complete Ban

The government and the Supreme Court are yet to completely ban the production and sale of firecrackers. The following points will be explained in the context of an assumption that a complete ban has been put into place.

Advantages

1. It helps in the process of accomplishing many Sustainable Development Goals such as good health and wellbeing (SDG-3), climate action (SDG-13) and sustainable consumption and production (SDG-12). Even though firecrackers only contribute to 0.03 per cent of the world's pollution, the firecrackers cause a sudden spike of harmful gases in the air and as it's not distributed evenly throughout the year, it increases the damage in real-time.
2. It can save the government money from the GDP. The combined effect of farmers setting ablaze crop residue and the festive crackers set off during the Hindu festival of Diwali can cost the economy up to $190 billion (Rs13 lakh crore), or 1.7% of India's GDP, over the next five years. This loss comes from the human cost: Residents of India's capital, New Delhi, and the neighbouring states of Punjab and Haryana collectively lose 19.2 million healthy man-years due to the burning of crop residue and firecrackers. Thus banning firecrackers completely cuts down the share of GDP lost. (Singh, 2019)

3. It will allow a strict crackdown on illegally smuggled fireworks. According to the Directorate of Revenue Intelligence, the import of firecrackers is 'restricted' in terms of foreign trade policy. But a huge quantity of hazardous Chinese firecrackers had reached India illegally ahead of Diwali. The Chinese crackers are not only dangerous for the environment but are also against Explosive Rules, 2008 as they contain banned chemicals like red lead, copper oxide and lithium among others. A complete ban on firecrackers will make it easier to spot smuggled firecrackers and the routes that have been used to do the act. (Sharma, 2019)
4. It would help avoid religious tensions. As compared to a partial ban, a complete ban on firecrackers would assure the public of the decision being an environmental law rather than a religious one. The arguments against the ban were that it went against "traditions" of a particular religion but as Justice Chandrachud noted in the Sabrimala judgement that only "essential religious practices" are protected by the constitution. A practice is only considered "essential" if the absence of the practice changes the nature of the religion itself. But by banning firecrackers completely it'll be established that the decision was made with secular intentions.
5. It could help prevent many cases of animal cruelty and protect street animals. Vets say that a sudden bright burst of light can result in partial or even permanent blindness in these animals. Many lose appetite. The deafening crackers have been known to cause temporary deafness in animals and disorient birds, making them fly out of their shelters into alien corners in search of safety. As most birds have poor vision, especially at night, they bump into unknown objects and injure themselves. The smoke also affects them. The bright glare of burning firecrackers can also burn or permanently blind flying birds. Owls, kites and bats are the worst-affected. Some communities sacrifice owls during Diwali as they consider it auspicious. The cases of animal cruelty increases during major festivals as many incidents of firecrackers being tied to the tails of these animals are reported. Hence a complete ban on firecrackers would reduce the danger to many animals. (Mohan, 2017)

Disadvantages

1. The biggest disadvantage is the complete loss of livelihood to hundreds of families involved in the production process and sale of firecrackers. The government affidavit says there are 1,750 firecrackers manufacturing industries in Tamil Nadu, which employs 5,000 families directly or indirectly. If an alternate source of employment is not generated then, in Sivakasi (firecracker capital of India) alone, over 8 lakh people stand to lose their jobs. These families have been in the business for generations and hence do not have any other source of income nor are they skilled enough for a different employment route. Thus a complete ban on firecrackers disproportionately affects the most economically unsafe members of society. (Jagannath, 2018)
2. A complete ban would drastically affect the economy. The firecracker industry is estimated to be worth Rs 6,000 crore. A huge amount of revenue is generated during festivities, especially during Diwali, Christmas and New year. This could negatively affect the GDP especially considering that India's economy is currently in recession furled by the pandemic. (PTI, 2018)

6.0 Case Study- Sivakasi

Sivakasi is a city in the Virudhunagar district of Tamil Nadu, with a population of 2,34,704 (Census 2011 India, 2011). The city is known for its firecracker, matchbox and printing industries owing to its hot and dry climate. The city is considered to be the firecracker capital of India, producing over 90% of India’s firecrackers and is estimated to be around 800- 1000 crore in value. Nearly 450 firecracker factories are employing over 40,000 people directly and over 1 lakh people indirectly in paper tube making, box making, wire cutting etc. (Sivakasi Online, 2018)

The city has its own Fireworks Research and Development Centre. This centre was started to set quality and safety standards for the entire industry and take on the responsibility of testing the raw materials, monitoring the hazardous manufacturing process and safety of the personnel, among others. (Roysam, 2016)

6.1 Health conditions of workers of Sivakasi

The health conditions of workers in cracker industries have never been the best. 143 male and female workers from a firecracker factory were subjected to a hair sample study to analyse the presence of trace metal elements. It was found that they have higher levels of Cr and Mn and the ones having nervous diseases and higher Cr, Mn and Pb levels. A detailed study showed that female workers had higher Pb and lower Mn levels compared to their male counterparts.

Workers had cases of chronic fatigue, dizziness and ulcers due to continuous Mn exposure. the workers didn't wear masks or gloves so the respiratory tract was deducted as the possible source of entry of the metal. (Katoria et al., 2013, p. 260)

6.2 Child labour is Sivakasi

The world's largest concentration of child labour works in the Sivakasi units. Out of a total population of 100,000 workers in the match and fireworks industries, the child worker population is around 45,000. An estimated 44 per cent of the child workers are below the age of 15. Girls outnumber boys in every factory, for they are considered more dexterous. The younger children between four to seven earn 2 rupees a day for a 12-hour shift with no days off while the older children earn approximately 7 rupees. (Kothari, 2014)

6.3 Factory explosions

On average, 25 people die in factories every year. In a blast in 1991 in a factory, 39 people were killed and 65 others were injured. In July 2009, more than 40 people were killed in a fire accident in a firecracker unit. The police traced out unregistered units and irregularities that led to the accident. In a fire accident in August 2011, seven people were killed and five were seriously injured. A similar fire accident and blast in a private unit in September 2012 killed 40 people and injured 38 others. (Wikipedia contributors, 2020)

In February 2012, a cracker factory in Chellapathi village, 20 km from Sankarankoil, went up in flames. Six children were burnt to death in the fire; they had been stuffing gunpowder into firecrackers when the accident occurred.

6.4 Pollution in Sivakasi

Sivakasi is the most polluted town in Tamil Nadu. The air pollution level at a point of time was 1413 micrograms of minute particles in comparison to the 10-28 micrograms in non-factory areas. It has been estimated 2000 people die annually due to air pollution. An increase in average temperature (340c), lack of rain and most of it being acid rain, firing wood, waste, chemicals are some other problems. Careless handling of raw material impairs the safety and health of the people engaged or connected with the industry and pollutes the general environment. Certain uncontrolled development carried out by factories like chemical, ginning, ink, foundries, spinning etc., cause danger to workers employed in the factory and also to the people living nearby in addition to the adverse effect on the environment. During the testing season of firecrackers over 2000 tons of waste is produced, mostly comprising burnt paper and a mixture of deadly gases but then municipalities only provide over 160 dustbins and 2 dump units, far from sufficient in comparison to the waste generated. Noise pollution is another health hazard. The prescribed level from crackers is 90 decibels (dB). During festive seasons, testing and functions it reaches a maximum of 160 dB. (Stella Muthu Rajam & Sathiabama, 2015, p. 37)

6.5 Aftermath of the ban on firecrackers

Previously in 2017, under the GST, firecrackers had been covered in the luxury bracket, taxed at 28 per cent. The larger businesses, with more than an annual turnover of Rs 1.5 crore, were already paying about 27 per cent under the Central Excise Tax and local taxes, before the GST. While these firms were able to absorb the GST shock, the smaller firms saw the taxes increase from about 16 per cent to 28 per cent. As a result, production decreased by 20-25 per cent that year. (Babu, 2017)

Many states/UTs have banned firecrackers during Diwali and other festivals to avoid problems for patients of Covid-19, which is primarily known to impact the respiratory system. As a result, insiders say, the industry may be looking at losses of over Rs 800 crore this year alone, which threatens the livelihood prospects of 8 lakh workers.

Since the pandemic began, say Sivakasi manufacturers, demand has dropped by more than 35 per cent, and production units have been functioning at less than 100 per cent strength because of social distancing guidelines. (Swamy, 2020)

According to Tamil Nadu Fireworks and Amorces Manufacturers' Association (TNFAMA), the apex body of the industry in the state, labourers had been trained in batches to produce green crackers and had no problem getting the stocks ready but the banning of firecrackers in the states of Gujarat, Maharashtra, Rajasthan and Karnataka, which usually have the highest demand has affected the sales deeply. (Simhan, 2019) The future if the industry looks bleak. If the government doesn't reduce the magnitude of the ban and make changes to the GST laws then many small cracker companies will go under for good. Moreover, the larger firms are aiming at investing in machinery which will improve working conditions but the possibility of large scale layover of workers hangs over their head. (Babu, 2017b)

7.0 Actions taken by the government

7.1 Laws

Even though there aren't many permanent laws regarding firecracker production and sales, there are many exports and imports, along with quality conditions that are used to regulate the industry. The most significant of these is the Explosives Rules, 2008 put forth by the Petroleum and Safety Organisation, to curb the threat to health and environment caused by fireworks.

Some of the important laws and legislations are as follows:

1. The import of fireworks is restricted and requires an import license from the Directorate General of Foreign Trade.

   1.1 Till date, no license to import fireworks has been granted for possession and /or sale under the Explosives Rules, 2008, by Petroleum and Explosives Safety Organisation (PTI, 2017)

   1.2 This is because fireworks have been categorised under restrictive items by the Director-General of Foreign trade, the Petroleum & Explosives Safety Organisation (PESO) (Roysam, 2016b)
2. The Department of Industrial Policy & Promotion, Ministry of Commerce & Industry has banned illegal import, possession and sale of fireworks of foreign origin.

3. The development comes as a breather for the fire cracking industry in Sivakasi which has been raising concerns over the illegal imports of firecrackers, from China into the country.
4. India does not export a lot of firecrackers. But this has less to do with legislation and more to do with the problem here is unsuitable storage and inadequate shipping facilities. Importing countries impose strict regulatory standards that India has been unable to meet. Being the second-largest firecracker industry in the world gives us great potential to turn those commodities into foreign revenue. The government is constantly trying to improve our shipping standards to no avail (Roysam, 2016b)

Diwali date	Diwali Day		Day after	
Nov 11, 2015 No firecracker ban in place	343	Very harmful	360	Very harmful
Oct 30, 2016 No firecracker ban in place	431	Hazardous	445	Hazardous
Oct 19, 2017 SC bans sale of firecrackers	319	Very harmful	407	Hazardous
Nov 7, 2018 Only green crackers allowed	281	Poor	390	Very harmful
Oct 27, 2019 Only green crackers allowed	337	Very harmful	368	Very harmful
Nov 14, 2020 Complete ban on crackers	414	Hazardous	465	Hazardous

November 14, 2020 (Day after) figures till 9 am (24-hour average).

Figure 1

5. The government has imposed a partial ban on firecrackers in previous years. The above table (Figure 1) shows that from 2017 to 2020 the government has passed some form of regulatory legislation regarding sales and production of fireworks.

Apart from these certain legislations are in the process of being enacted that could affect firework production and sales in India.

1. The government has proposed to amend the Customs Act to give it wide powers to ban imports and exports of goods that may hurt the local economy, clearing the way for it to bar imports of firecrackers from China.

1.1. So far, the government had powers to only ban imports and exports of gold and silver under the Customs Act, 1962. Once approved, the amendment, through the Finance Bill, will expand the government's power to ban imports or exports of all goods.

7.2 Shortcomings

1. Even with a strict ban on imports without a license, the government hasn't been able to reduce the illegal movement of Chinese firecrackers into Indian soil. China is the largest producer of firecrackers which they sell at lesser prices. Chinese firecrackers also contain many toxic elements banned to be used in the production of Indian firecrackers.
2. The mere fact that Indian firecrackers don't meet the required standards in quality and sound to be exported into other countries is proof that it is an underutilization of our resources. Moreover, it gives the public the opinion that their health and well being are subjected to lower standards than their foreign counterparts.
3. As the above table shows, the partial ban on firecrackers was somewhat effective but the air quality of Delhi and many other cities and states of India is rapidly deteriorating. Partial and maybe even a full ban of just firecrackers is not going to be enough to make a significant change.

8.0 Final thoughts

From the comparative analysis, it's clear that a complete ban on firecrackers would be more beneficial than a partial ban. Banning firecrackers completely helps prevent the concentration of dangerous pollutants in the air during the days of festivities and hence helps create avoid deterioration of health of the people to a certain extent. In addition to this, it's a positive step towards environmental protection and activism. A complete ban ensures order in the tackling of illegal movement of the crackers and also makes sure there aren't religious tensions stemming from feelings of disparity. But the step to completely banning firecrackers will only be possible if equal numbers of alternative jobs are generated as much as is lost.

From the case study, it's clear that lakhs of people are directly or indirectly involved in this multi-million dollar industry and that these people pass the employment onto their children and hence it continues to sustain entire families.

If alternate employment, with minimum wages, is not generated in time then Hundreds of families, mostly the extremely marginalised sections of society, will be ruined for eternity. The government has to work together with private players and NGO's to ensure that any major legislation will not result in utter chaos. But the question still remains; is India ready to go firecracker free?

It must also be kept in mind that a complete ban on firecrackers will not magically purify our polluted skies. The majority of pollution is still caused by vehicular and industrial emissions. Without proper policy measures to tackle the above-mentioned obstacles, effective change will not be created. People will continue to live under the obsolete grey covers. It is high time to begin taking radical steps towards achieving the SDGs and certify that our future will be able to experience a future. That being said, it is of the essence that we do not leave the entire responsibility to the higher authorities. In our ways, little steps can be taken to help humanity survive. With that, the author urges all the readers to celebrate responsibly and try to avoid bursting crackers and create too much waste. Let our festivities be humble and sincere where everyone spreads love, not litter.

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