

“Impact of COVID-19 Lockdown Policy on Air and Automotive Industry”

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Abstract

Global tsunami of coronavirus (COVID-19) has affected the three dimensions of sustainability simultaneously in Pakistan. The pandemic has not only disrupted the health of people but has also fractured the economy and hit the social norms adversely. To control the havoc of this pandemic, the remedial measure i.e. lockdown is adopted in Pakistan during March 2020. To examine the outcomes of this adopted measure (lockdown), the present study is carried out to assess the air pollution level and the largest source of air emission i.e. automotive industry. For air quality assessment, the spatial technique was adopted using ArcGIS 10.6. While auto motors population is evaluated through secondary data which is derived from Pakistan Automotive Manufacturer Association (PAMA). The spatial results of air indicated that the air quality has shown improvement during lockdown. Moreover, the data analysis of automotive industry indicated the decline in the spectacular growth of vehicles during this pandemic. So, the article concludes that the remedial policy (lockdown) has dual impact *viz.* in decreasing air emissions as well as vehicular population in Pakistan.

Keywords: Air Pollution Pakistan, COVID-19 and Auto Industry, Environmental Regulations, Lockdown, PAMA.

Introduction

Pakistan faced the fatal outbreak of coronavirus in the end of February when most of the areas of the country were shrouded with thick smog. Since 26th February, the percentage of confirmed cases of coronavirus is going to increase after the first reported case¹. As per statistics, the fatal rate of pandemic was recorded with highest volume initially in the Sindh². Thus, due to this highest volume, Sindh took the initial steps to control this disease while

¹ Ali I. Pakistan confirms first two cases of coronavirus, Govt. says “no need to panic”. <https://www.dawn.com/news/1536792>. Accessed 25 March 2020.

² Ahmed A. Pakistan records spike in number of coronavirus cases as the government takes preventive measures. <https://gulfnews.com/world/asia/pakistan/pakistan-records-spike-in-number-of-coronavirus-cases-as-the-government-takes-preventive-measures-1.70403993>. Accessed on 15 March 2020.

other provinces followed the proactive measures later³. On getting the condition critical, the other provinces took measures later to curb COVID-19 in March, 2020 approximately right after one month of the first reported case⁴.

From 20th March, 2020, the government launched the pandemic control measures to reduce the transmission of COVID-19 in terms of closure of educational institutions, markets, shopping malls, restaurants, marriage halls, parks, zoos, play areas, gyms till 24th March, 2020 and then further extended this closure to 5th April, 2020^{5,6}. Further, to slow down the speed of this pandemic, the 'lockdown' policy was initiated to get rid from COVID-19. In the meantime, policy measures were further amended to suspend all the academic activities till 31st May, 2020⁷.

During COVID-19 pandemic, the world faced highest mortality rate but on the other side, it proved to be a prominent factor in the reduction of air emissions and population of motor vehicles. It is the one and only virus who demonstrated a new era to get rid of all the preceding impossible environmental problems in a possible way. As per published statistics, Pakistan's neighboring country China⁸ reported with highest death rate. On the contrary, the reduction in nitrogen dioxide⁹ and vehicular sale was also reported in China. Thus, similar results were also reported globally¹⁰.

In the light of the ongoing crisis, the aim of the current study is to present an overview of the impact of this remedial measure of COVID-19 (Lockdown) with special reference to air pollution and automotive sector of Pakistan.

³ Butt T. Fighting against Covid-19: Sindh Govt. surpasses everyone with exceptional performance. <https://www.thenews.com.pk/print/631296-fighting-against-covid-19-Sindh-govt-surpasses-everyone-with-exceptional-performance>. Accessed 19 March 2020.

⁴ Coronavirus. Punjab CM Buzdar announces 14-day lockdown across the most populous province of Pakistan. <https://nation.com.pk/23-Mar-2020/punjab-cm-buzdar-announces-14-day-lockdown-across-the-most-populous-province-of-pakistan>. Accessed 23 March 2020.

⁵ Khalti AS. Shopping malls, markets closure for two days notified. <https://www.thenews.com.pk/print/632705-shopping-malls-markets-closure-for-two-days-notified>. Accessed 22 March 2020.

⁶ Adnan I. & Khan R. Public spaces virtually locked down across Punjab till April 5. <https://tribune.com.pk/story/2176723/1-section-144-imposed-punjab-amid-covid-19-fears/>. Accessed 15 March 2020.

⁷ Punjab Government to extend vacations till 31st amid Coronavirus outbreak. https://www.eduvision.edu.pk/edu_news/punjab-government-to-extend-vacations-till-may-31-amid-coronavirus-outbreak-news-3113. Accessed 25 March 2020.

⁸ Isaifan, R. J. (2020). The dramatic impact of Coronavirus outbreak on air quality: Has it saved as much as it has killed so far?. *Global Journal of Environmental Science and Management*, 6(3), 275-288.

⁹ Wang, P., Chen, K., Zhu, S., Wang, P., & Zhang, H. (2020). Severe air pollution events not avoided by reduced anthropogenic activities during COVID-19 outbreak. *Resources, Conservation and Recycling*, 158, 104814.

¹⁰ McGrath M. Coronavirus: Air pollution and CO2 fall rapidly as virus spreads. BBC News. Accessed on 28 March 2020. <https://www.bbc.com/news/science-environment-51944780>.

Materials and Methods

Country Overview

Geospatially, Pakistan is situated between 24-37°N latitude and 61-76°E longitude¹¹ (Fig. 1) and bestowed with the great diversity of landscape¹² which is spread in its provinces. The country has the continental nature of climate and four dominant seasons in a year. The different types of economic structures exist in the country due to the variety of landscape. In the current scenario of global environmental issues, Pakistan has the top leading issue of polluted air¹³ and the biggest causes of emissions are vehicular growth, industrial expansion and extensive stubble burning. Hence, automotive industry is one of the biggest sources of air pollution in Pakistan¹⁴ and occupied the thirtieth number globally in vehicle production¹⁵.

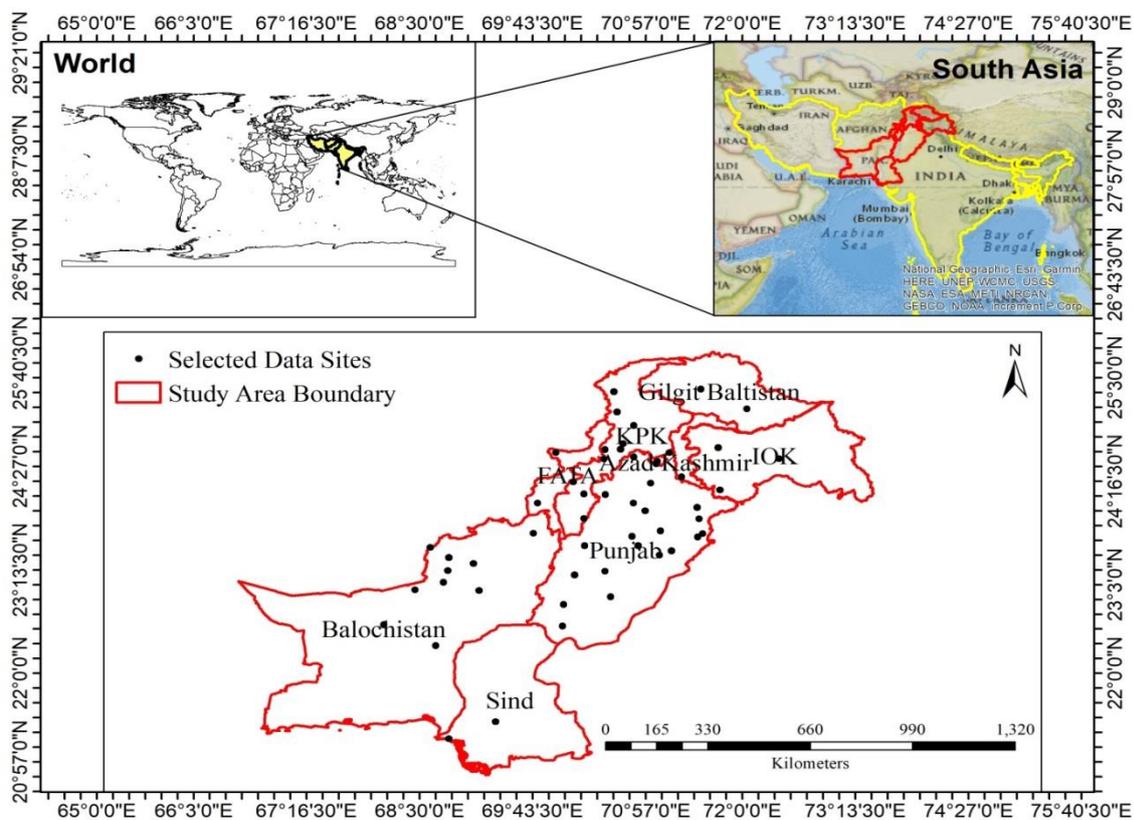


Fig.1. Map of the Study Area

¹¹ Hussain, M. S., & Lee, S. (2009). A classification of rainfall regions in Pakistan. *Journal of the Korean Geographical Society*, 44(5), 605-623.

¹² Pervez, S., Siddique, M. S., Abdullah, H. Y., Zahra, A., Khanzada, N. K., Fareed, H., & Hasnain, G. (2017). Determination of Diverse environmental pollution level from selected areas of Rawalpindi, Pakistan. *Journal of Mountain Area Research*, 2, 16-22.

¹³ Purohit, P., Munir, T., & Rafaj, P. (2013). Scenario analysis of strategies to control air pollution in Pakistan. *Journal of Integrative Environmental Sciences*, 10(2), 77-91.

¹⁴ Brohi, K. M., Harijan, K., Uqaili, M. A., & Memon, M. D. (2007, February). Renewable fuel alternatives for transport sector in Pakistan. In *international conference on renewable energy for sustainable development in the Asia Pacific Region, Fremantle, Australia* (pp. 4-8).

¹⁵ Wikipedia (2020). List of countries by motor vehicle production. https://en.wikipedia.org/wiki/List_of_countries_by_motor_vehicle_production. Accessed 23 May 2020.

Air Quality Index (AQI)

The Air Quality Index (AQI) has been used for the assessment of air quality¹⁶. The AQI is comprised of six different classes¹⁷ having numerical values and color codes which describe the status of air. Class 1: 0–100 (Green), Good. Class 2: 101–200 (Light Green), Satisfactory. Class 3: 201–300 (Yellow), Moderately Polluted. Class 4: 301–400 (Orange), Poor. Class 5: 401–500 (Red), Very Poor. Class 6: 500+ (Maroon), Extremely Poor¹⁸ (Fig. 2).

Automotive Data

The motor vehicles production and sale data has been obtained from the official website of Pakistan Automotive Manufacturer Association (PAMA) www.pama.org.pk/statistical-information/sales-production/monthly-sales-production.

METHODS

Data analysis

The standard criteria of air pollutants have been applied to examine the level of air pollution in Pakistan with a resolution 80km x 80km on 27th March, 2020 (Fig. 2). Spatial assessment of air emissions has been collected from the website (<https://www.iqair.com/>). For the determination of results, the geospatial tools and techniques have been adopted using GIS 10.6 to prepare map. The metrological data has been obtained from National Climate website on 27th March, 2020 (<https://www.accuweather.com/en/pk/pakistan-weather>).

RESULTS AND DISCUSSION

Spatial Distribution of Air Quality Index of Pakistan

Pakistan has numerous sources of foul air but the most contributing sector of terrible air is automotive industry¹⁹ which has the lion share in the country's economy²⁰. During awful pandemic, the primary contributor of air emissions was halted and helped to recover the ill air. The results shown in Fig. 2 demonstrated the status of air quality index during lockdown. The analysis of AQI exhibited good level of air quality in the northern and southern areas of the country while satisfactory level of air quality had been recorded in the south-eastern and south-western sides of Pakistan. Moreover, moderately polluted level of air has been

¹⁶ She, Q., Peng, X., Xu, Q., Long, L., Wei, N., Liu, M., ... & Xiang, W. (2017). Air quality and its response to satellite-derived urban form in the Yangtze River Delta, China. *Ecological Indicators*, 75, 297-306.

¹⁷ Javed, W., Murtaza, G., Ahmad, H. R., & Iqbal, M. M. (2014). A preliminary assessment of air quality index (AQI) along a busy road in Faisalabad metropolitan, Pakistan. *International Journal of Environmental Sciences*, 5(3), 623-633.

¹⁸ EPD (2018). Smog Commission, Environment Protection Department, EPD, Punjab. Accessed 25th May 2020. https://epd.punjab.gov.pk/smog_commission_reports

¹⁹ Ilyas, S. Z. (2007). A review of transport and urban air pollution in Pakistan. *Journal of Applied Sciences and Environmental Management*, 11(2).

²⁰ Ahmed, A., & Ahsan, H. (2011). Contribution of services sector in the economy of Pakistan. *Working Papers & Research Reports*, 2011.

documented in some areas of Punjab and Khyber Pakhtunkhwa (KPK). On the other side, poor and very poor level of AQI had been observed in the few parts of the country. According to the results shown in Fig. 2, it can be observed that most parts of Sindh have satisfactory level of air quality and some parts of Balochistan had also been recorded within the permissible range of Punjab Environmental Quality Standards (PEQs). Thus, initial study results show that pandemic crisis restricted the human activities which ultimately improved the AQI nationwide.

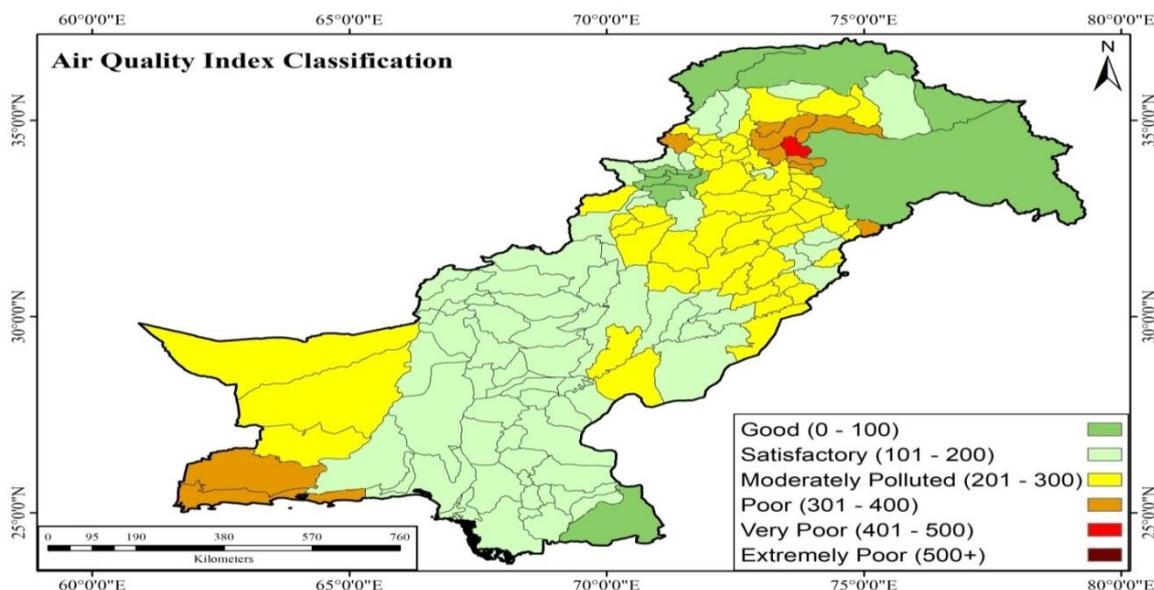


Fig. 2: Air Quality Index of Pakistan in March 2020

Furthermore, the metrological factors have also been strongly associated with the reduction in airborne sludge which supported the similar findings of India²¹ (Fig 3).

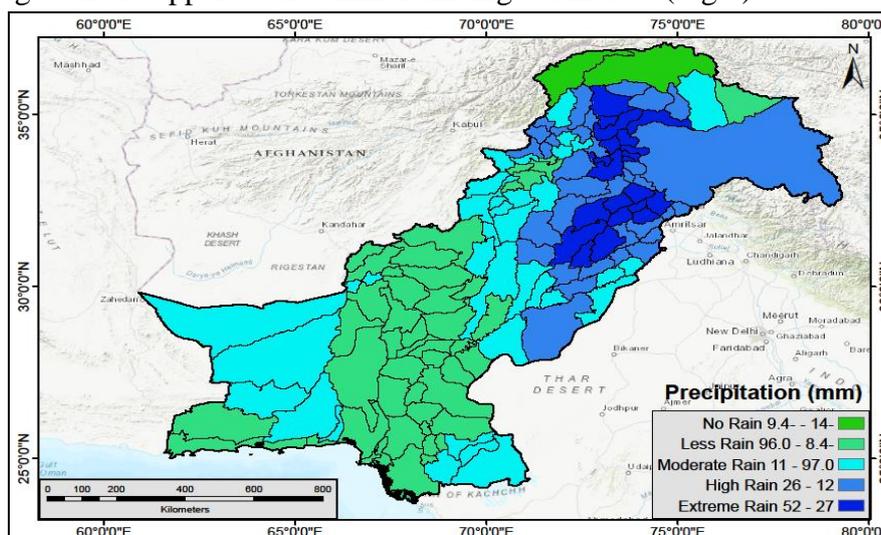


Fig. 3: Metrological Condition of Pakistan in March 2020

²¹Sharma, S., Zhang, M., Gao, J., Zhang, H., & Kota, S. H. (2020). Effect of restricted emissions during COVID-19 on air quality in India. *Science of the Total Environment*, 728, 138878.

Thus, the outcomes of lockdown indicated that coronavirus has cleaned the polluted air temporarily at small scale. But there is an opportunity for the regulatory bodies to control the exposure of air pollutants by strict execution and implementation of existing laws and regulations.

Vehicular Population during 2007-2008, 2018-2019 and 2020

The use of motor vehicles has increased²² tremendously due to the urban explosion and industrialization in Pakistan. Data from the PAMA has shown the incredible rise in vehicular population during the year 2018-2019 as compared to 2007-2008 (Fig.4). Likewise in other countries, the growth level of vehicles has increased since 80s. But due to the outbreak of coronavirus, the country adopted lockdown measure like China²³ and imposed ban on vehicles mobility nationwide. Thus, the initiated policy of lockdown has not only hit the production and sale of motor vehicles all over the world but also declined the number of vehicles in Pakistan. In the current context of COVID-19, a negative association has been developed between auto industry and auto manufacturer at large scale (Fig. 7). Although, Pakistan’s lockdown measure was not stringent like China but ripple of crisis destabilized the automotive sector tremendously. Considering the widespread pandemic, there is an urgent need to launch new strategies to support automotive industry in the time of crisis.

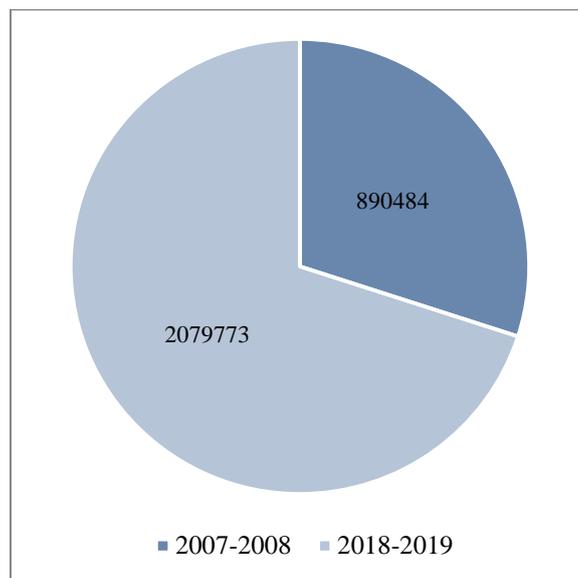


Fig.4: Vehicular Sale during 2007-2008 and 2018-2019 (Source: PAMA, 2020)

From the results of Fig. 5, it is reflected that highest population is dependent on 2/3 wheelers vehicles. However, the number of cars occupied second highest rank. Further, the populations

²² Aziz, A., Bajwa, I. U., Ahmad, I., Mayo, S. M., & Rahman, A. (2013). Urban Air Quality And Unrelenting Peril Of Vehicular Emission (Policy And Priorities Of City District Government Lahore). *Pakistan Journal of Science*, 65(2).

²³ Chen, K., Wang, M., Huang, C., Kinney, P. L., & Anastas, P. T. (2020). Air pollution reduction and mortality benefit during the COVID-19 outbreak in China. *The Lancet Planetary Health*, 30107-8.

of tractors fall in the third category which is the most frequently used vehicle in the agriculture sector of Pakistan.

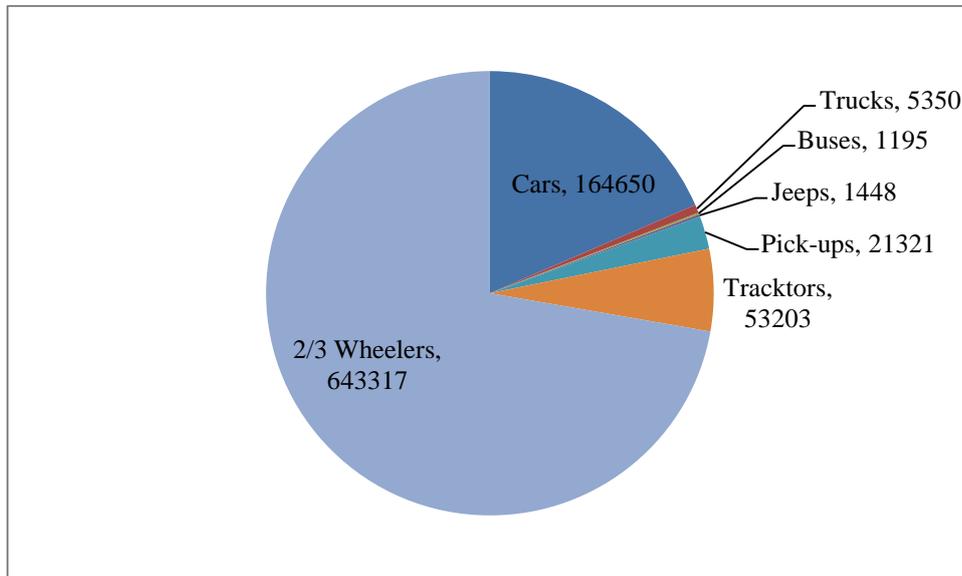


Fig. 5: Vehicular Sale during 2007-2008 (Source: PAMA, 2020)

Figs. 5 and 6 provide the insight of auto industry which is known as the large market by volume in Pakistan. On comparing statistics of both figures, it has been noticed that automotive industry has experienced a significant growth in its market size. From results, it has been noticed that 2/3 wheelers sale is on the top of list which has been raised during 2018-2019. In addition, other vehicle population has also been increased as compared to 2007-2008 which exhibited the market trend of motor vehicles. Thus, the comparison of data depicted that remarkable development in the automotive industry is because of the vehicles financing and the minimal premium.

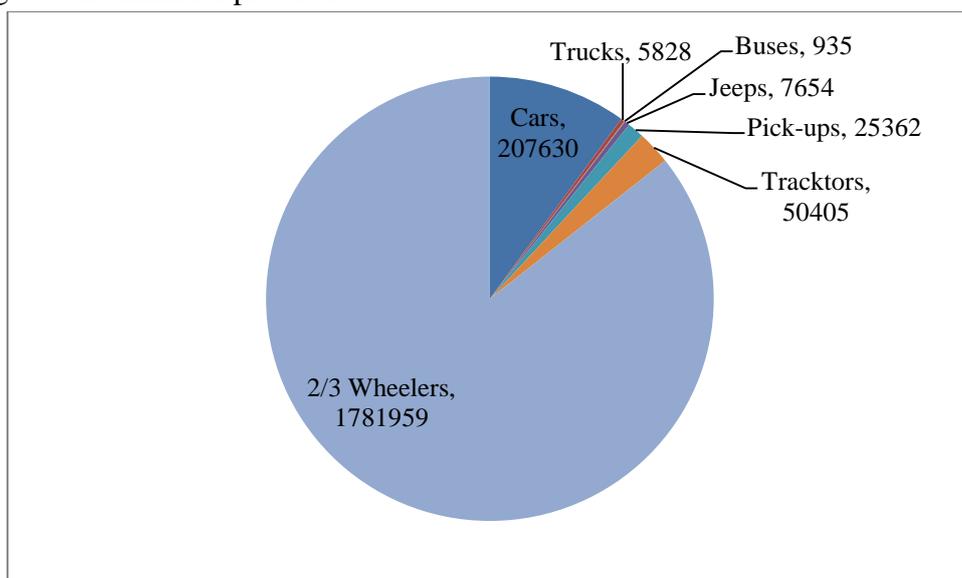


Fig.6: Vehicular Sale during 2018-2019 (Source: PAMA, 2020)

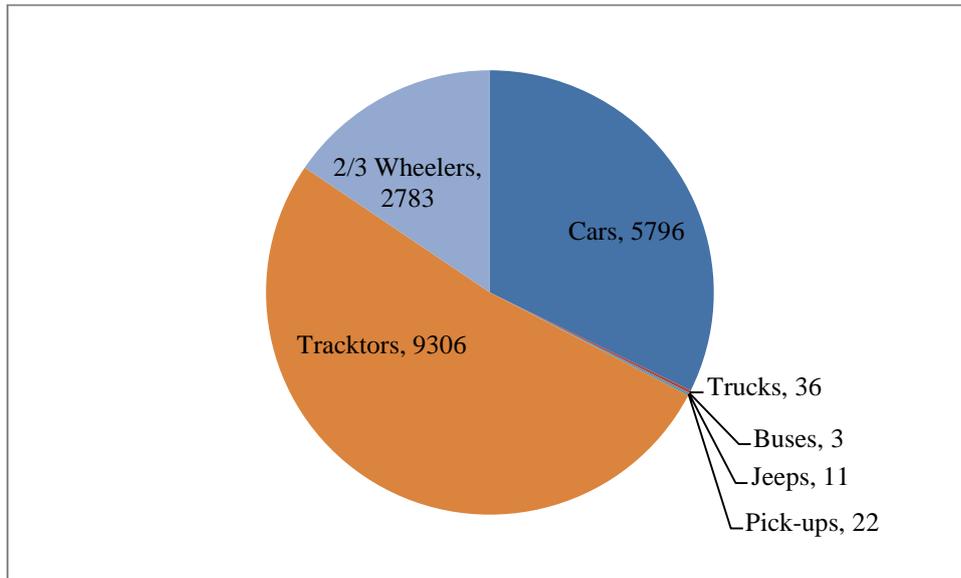


Fig. 7: Vehicular Sale during lockdown (Source: PAMA, 2020)

According to Fig. 7, the noticeable reduction is observed in the sale of motor vehicles when the COVID-19 erupted and enacted lockdowns worldwide. Vehicle manufacturing plants and showrooms were shutdown globally including Pakistan and sale of auto motors fell drastically. Prior to pandemic, the vehicular sale was already in crisis due to the emission related cost and on top of it, coronavirus collapsed the automotive market within few months globally²⁴. According to available statistics, only thirty six trucks, three buses, twenty two pick-ups, eleven jeeps have been sold out²⁵ yet whereas the highest number of sale has been recorded of tractors due to the wheat harvesting season in March, 2020 which presents the gloomy picture of automotive sector.

CONCLUSION

The present findings of the study conclude that the partial lockdown has been only impactful in the reduction of air emissions in Pakistan. In the prevailing situation of pandemic, all the adopted measures got ineffective as the reported cases of this disease are increasing in spite of decreasing. So, it is exhibiting the low efficiency in implementation of national action plan *i.e.* insufficient implementation of administrative law and order system is neither saving humans nor the economy. Ultimately, there is a great need to focus on the contingency strategies to save the extent of this dreadful evil by determining the economic, social and environment factors of sustainability.

²⁴ Madhok A. Weekly Update: COVID-19 Impact on Global Automotive Industry. <https://www.counterpointresearch.com/weekly-updates-covid-19-impact-global-automotive-industry/>. Accessed 26 May 2020.

²⁵ Sachwani A. Zero Car Sales Recorded in Pakistan for April 2020: PAMA. <https://www.brandsynario.com/zero-car-sales-recorded-in-pakistan-for-april-2020-pama/>. Accessed 13 May 2020.