

Chapter 4

Boon for the Environment and Bane for the Economy: Emerging Debate in Pandemic Stuck India



Tanmoy Sarkar and Jayanta Mondal

Abstract The COVID-19 pandemic shock has painted some unprecedented portrayal and presented some exceptional visuals regarding the economy vs. environment debate worldwide. The history of human civilization is impregnated with the exploitation of the environment. The world needs a long and clear vision where economic activities and developmental goals meet environmental sustainability. The fatal coronavirus and Covid-19 pandemic have already affected more than 216 countries worldwide, with more than thirty-six million confirmed cases, including millions of death tolls. Now, India has the second-largest number of Covid-19 affected confirmed cases. The pandemic-driven nationwide lockdown has had a fatal impact on the economy. The supply-side and demand-side for entire economic sectors were disrupted, industrial production has come to a halt, millions of jobs were lost, Gross Domestic Product (GDP) was eroded away at an unprecedented rate, economic anxiety is inevitable in every sphere of life and livelihood. The GDP shows the last 20 years lowest in 2020. The impact of such an economic fallout is supposed to sustain for a long time with its deadly impact directly and indirectly. However, when we come to the environmental aspect, the lockdown exerts a very positive impact. The environmental pollution has been reduced remarkably, and the response in air quality, water quality, wildlife, and vegetation are remarkably flourishing. However, it would not be wise to blame the rampant economic activities and developmental initiatives for the present catastrophic situation. The economy must move on, industrial development would be geared up, and developmental projects must be initialized, but there should be a balance between economy and environment. Human civilization's sustenance needs mutual harmony with the natural environment, and sustainable development is the safest avenue ahead.

T. Sarkar (✉)

Department of Geography, Gazole Mahavidyalaya, Gazole, West Bengal, India
e-mail: srkratanmoy@gmail.com

J. Mondal

State Aided College Teacher, Department of Geography, Dr. Meghnad Saha College, Itahar, Uttar Dinajpur, Ranipur, West Bengal, India

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4.1 Introduction

Confusions, contradictions, and controversies have had been accustomed to sensible nexus between environment and economic development. Throughout the history of human civilization, the environment has had an inevitable fate of exploitation. The natural environment has a limited resilience to absorb and sustain against the small-scale exploitations. Every economic principle and mode of production exerts its impact on the environment with varying degrees across time and space. However, the emergence of capitalism and the industrial revolution had revolutionized the mode of environmental exploitation. When every part of nature and natural resources are being evaluated and targeted for capital gains, the exploitation becomes limitless, and the destruction becomes disproportionate. Several International Conventions and strategies are there to protect the environment, e.g., the Stockholm Declaration (1972), the World Conservation Strategy (1980), World Charter for Nature (1983), Brundtland Commission, Earth Summit Resolution, and declaration of Agenda-21 (1992), Malmo Declaration (2000), Rio + 10 and Rio + 20. However, all those global conventions declare the agendas, whereas environmental exploitation is continued in different shapes and various forms. Human civilization seems not in the mood to 'stay.' The 'growth' is felt like an extreme necessity and even at any environmental cost.

However, 2020 is the year when the entire world experiences the most common word of 'lockdown' in every sphere of life due to the fatal novel coronavirus attack. COVID-19 pandemic manifests worldwide. This malicious virus, which causes the World Health Organization (WHO) to declare the global pandemic, was first identified in Central China's Wuhan province (Huang et al. 2020) in December 2019. India has the second-largest number of COVID-19 confirmed cases (6,685,082 confirmed), including 103,569 death as of October 6, 2020, 10:27 am CEST (WHO Coronavirus Disease Dashboard 2020). The first case of COVID-19 in India was reported from Kerala in March, 2020. For combating the rapid transmission of the coronavirus and resist the death toll, the nations worldwide followed a complete shutdown. India was not an exception. Following the voluntary *Janta Curfew* (public curfew) on March 22, 2020, the Indian Government declared a nationwide lockdown from 24 March midnight. The entire nation experienced a complete shutdown for 21 days, and it was extended up to May 3, 2020 in the second phase of the lockdown declared on April 15, 2020; followed by the third phase of lockdown from May 4 to May 17, 2020. With the third phase of the lockdown announcement, India's Government divided all the districts into three zones based on the COVID-19 contamination character—'green' as least vulnerable, 'orange' as moderate, and 'red' as most vulnerable and some relaxations were announced accordingly. The National Disaster Management Authority (NDMA) further extended the lockdown from May 18 to May 31, 2020.

Moreover, the services have been started to resume in a phased manner vide Unlock 1.0 (June 1 to June 30, 2020), Unlock 2.0 (1 to July 31, 2020), Unlock 3.0 (1 to August 31, 2020), and Unlock 4.0 (1 to September 30, 2020). The usual flow of the world's economy, calculation of global politics, sociocultural harmony, academic, environment, people's normal lifestyle, everything has been drastically changed by the grasp of the life-threatening novel coronavirus, i.e., COVID-19 (Bera et al. 2020). Due to the lockdown, a drastic change in the weather pattern and pollutant parameter is witnessed.

4.2 Reinvigorating Environment

The COVID-19 pandemic driven nationwide lockdown heals the earth in a way never seen before. During the lockdown situation, humans are restrained from their routine activities. Nature started to readjust itself during the lockout condition, which had long been hampered due to pollution. India's pollution level exceeds the standard limit, which was determined by national ambient air quality standards. It affects the health condition at a severe rate (Ghose et al. 2004) in the Indian population. A huge number of people have a respiratory problem due to high air pollution (Smith 2000). COVID-19 induced lockdown results a remarkable change in air pollution (Singh et al. 2020) worldwide. If we take the starting date of lockdown as a breakpoint and analyze the environment's health during the lockdown and pre lockdown situation, the trend of pollution will be clear.

The monsoon climate dominates India. India experiences changes in temperature and rainfall trends due to global climate change, though the monsoon predominantly controls it. Different regions of India have faced a negative trend in rainfall during the last few decades. Patra et al. (2012) documented the negative trends in monthly, seasonal, and annual rainfall in the long term over Orissa. Praveen et al. (2020) analyzed the rainfall trend from 1901 to 2015 across India and observed an increasing trend during 1901–1950, while a declining rainfall trend was recorded after 1950 at an appreciable amount.

On the other hand, rising temperature trends have been observed (Fig. 4.1) in India. MERRA v2 data are used for assessing long term temperature trend analysis. The mean annual minimum temperature has been increased at 0.24 °C per 10 years over the Indian subcontinent (Rao et al. 2014). At the same time, the mean annual temperature was increased by about 0.4 degree Celsius per 100 years during 1901–1982 (Hingane et al. 1985).

The rapid urbanization and industrialization enhanced different pollutant levels considerably. The primary emission sources of Nitrogen dioxide (NO₂) are transport, thermal power plants, and industries. Human exposure to NO₂ over a short period causes infuriates asthma. On the other hand, the emission from industries and households contributes to PM_{2.5} and PM₁₀ in the lower atmosphere. Such particulate matters do create some serious health hazards, including premature mortality, respiratory symptoms, bronchitis. Sulfur dioxide (SO₂) is emitted mainly from coal-based

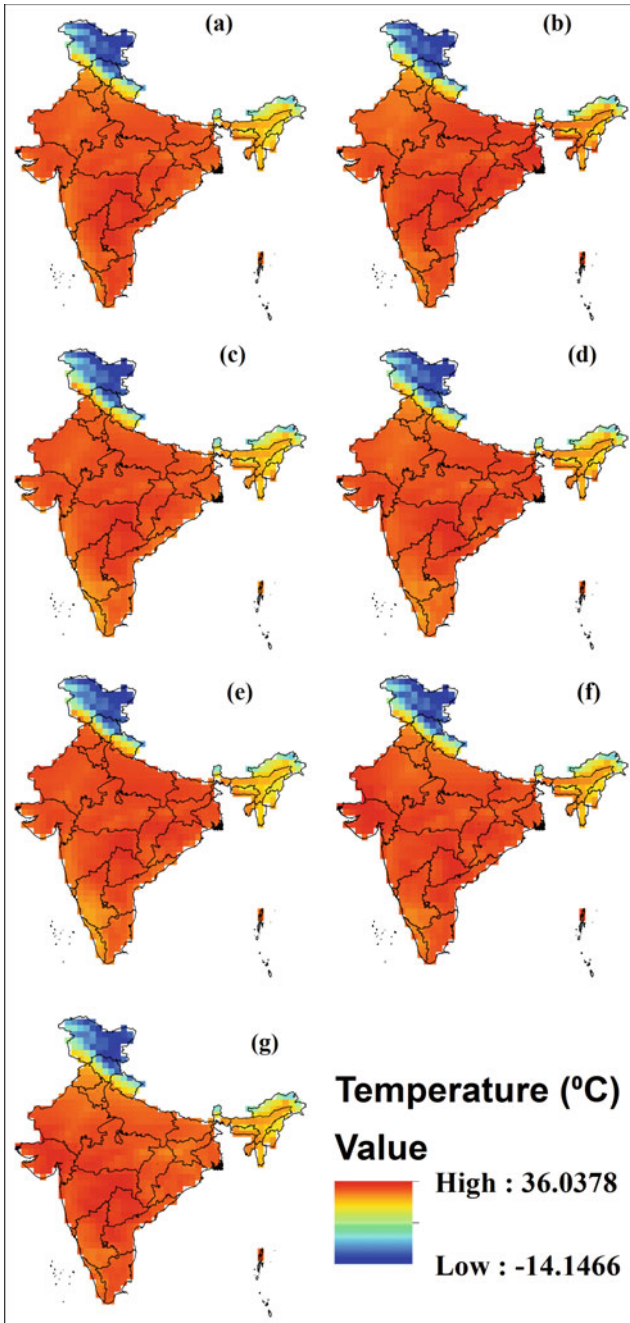


Fig. 4.1 Average temperature in the month of April in (a) 1990; (b) 1995; (c) 2000; (d) 2005; (e) 2010; (f) 2015; and (g) 2020

thermal power plants and different industries. SO_2 hampers the lung function and causes irritation to the eyes. Carbon dioxide (CO_2) emission is dominated by the transport sector, biomass burning, and fuel combustion (Sharma and Dikshit 2016).

WHO (2005) reported that 7 million people died throughout the world due to air pollution. Epidemiological research for the last couple of decades pointed out that air pollution plays a crucial role in various respiratory diseases, which is the pivotal cause of premature mortality in developing countries like India. China and India combined contribute to 52% of total $\text{PM}_{2.5}$ in the world, causing 1.525 million deaths in 2017 (Health Effects Institute 2019).

In general, the megacities of India used to face severe environmental problems due to heavy air pollution. The pollution levels surpassed the national air quality standards, as mentioned by the Central Pollution Control Board. Aerosols have caused serious human health issues. According to WHO's EPI (Environmental Performance Index), Delhi is regarded as the most polluted megacity in the world. It has been reported that 1 out of every 8 deaths has been caused due to high air pollution in 2017 (ICMR, PHFI, and IHME 2017).

4.2.1 Environmental Resilience Amidst Lockdown

Lockdown as a measure for combating the virus prohibits mass transportation and all non-emergency economic activities. As the commercial, transport, industrial activities have been ceased almost for quite a long time, the environment finds its way to replenish itself and successfully stress out the burden of anthropogenic disturbances (Bera et al. 2020). In this regard, the release of GHG (Greenhouse gases), power generation, vehicular movement, coal combustion, and poisonous particulates emission have been truncated. It results in the quality enrichment of the global climate, pollution-free sky, and a vigorous resurgence of the Ozone (O_3) layer (Chakraborty and Maity 2020). Lockdown becomes an amazing catalyst in reducing the energy consumption level. Fuel combustion drastically dropped down in the first half of 2020 as compared to preceding years. During the period of lockdown, emissions of hazardous gases put a break globally.

In the Yangtze River delta of China, the NO_2 , $\text{PM}_{2.5}$, and SO_2 have diminished (Li et al. 2020). Megacities of China experience a negligible concentration of pollutant gases amid lockdown (CAMS 2020) due to industrial activities confinement. Tobías et al. (2020) analyzed in detail that in the city of Barcelona (Spain), urban air pollution has diminished drastically just after two weeks of lockdown. PM_{10} concentration has a downfall by 28% for the traffic, and in the urban background stations, it has reduced by 31%. The Italian city of Milan witnesses a cut down of PM_{10} concentration during the partial lockdown phase and experiences a lowering by 13.1% during the total lockdown phase. A huge reduction (−57.6%) has been observed in the case of CO and NO_2 emission in Milan (Collinignarelli et al. 2020).

The suspension of industrial and commercial activities has lessened the pollution level in 88 cities of India (Sharma et al. 2020). A detailed study by Srivastava et al.

(2020) at 34 monitoring stations in Delhi reveals an appreciable reduction in CO, NO₂, PM_{2.5}, and PM₁₀ levels. The national air quality index reported an enormous improvement in air quality by 40–50%. Several studies (Maté et al. 2010) reveal that in Delhi, the average concentration of PM_{2.5} has been lowered down to 26 mg/m³ (on 27 March) from 91 mg/m³ (on 20 March) within a week of lockdown. An analysis by Mukhopadhyay (2009) spotlighted that in metropolitan Kolkata, 70% of people were victimized by lower atmospheric noxious pollutants. Global Carbon Project 2020 shows that the high emission rate of GHGs has been controlled in this period of lockdown, which is an unexpected phenomenon after World War II.

Worldwide lockdown works as a stimulus for revitalizing world climate. It gives ample opportunity for researchers to work in this unique direction. The present study focuses on the changes of atmospheric components like SO₂, NO₂, CO₂, and aerosols in India during the lockdown period. Therefore, another focus of this study includes the impact of lockdown on the environment. The results of this study will be helpful in determining the fruitfulness of full lockdown as a strategy for diminishing air pollution.

The direct and indirect impacts of lockdown on atmospheric pollutants have been assessed using satellite-based spatio-temporal products related to NO₂, CO₂, SO₂, and Aerosols. Carbon Dioxide, Mole Fraction in Free Troposphere, IR-Only (AIRX3C2Mv005, and AIRS3C2Mv005) products have been used to assess the scenario of CO₂ concentration over India. The concentration of CO₂ varies from 388.102 ppm to 392.737 ppm over India. The concentration of CO₂ hotspots has been increased in the different parts of the Indian subcontinent over the last two decades (Fig. 4.2).

Aerosol optical depth 342.5 nm_0.25 deg product has been used to depict aerosol optical thickness in this study. Long-term trend of aerosol optical depth shows that it has been increasing over the sky of India. 5.2–7.4 unit was the dominant cover of aerosol, observed in India, but interestingly it has been suddenly started to fall in its thickness during the lockdown period (Fig. 4.3).

MERRA v2 product was used to portray the view of SO₂ distribution. 1.80–2.68 kg/m² was the long-term range of SO₂ generally found in India. SO₂ concentration in the Indian subcontinent has been remarkably started to decrease during lockdown (Fig. 4.4). OMI product has been used to show the NO₂ distribution. NO₂ is another bold atmospheric pollutant. Normal range of NO₂ was $-2.0921e + 014$ to $1.44568e + 016$ mol/cm², generally found in India. However, during the lockdown, it has also been started to confine its arm over India's sky (Fig. 4.5).

4.2.2 *Inhale Afresh Amidst a Gasping Economy*

Anthropogenic encroachment in the environment teaches us how far we are responsible for our own destruction. The deteriorated air quality hampers the natural rhythm of the environment and obliges to turn down human health. It has been reported that acute air pollution brings death toll across the globe in the form of respiratory diseases

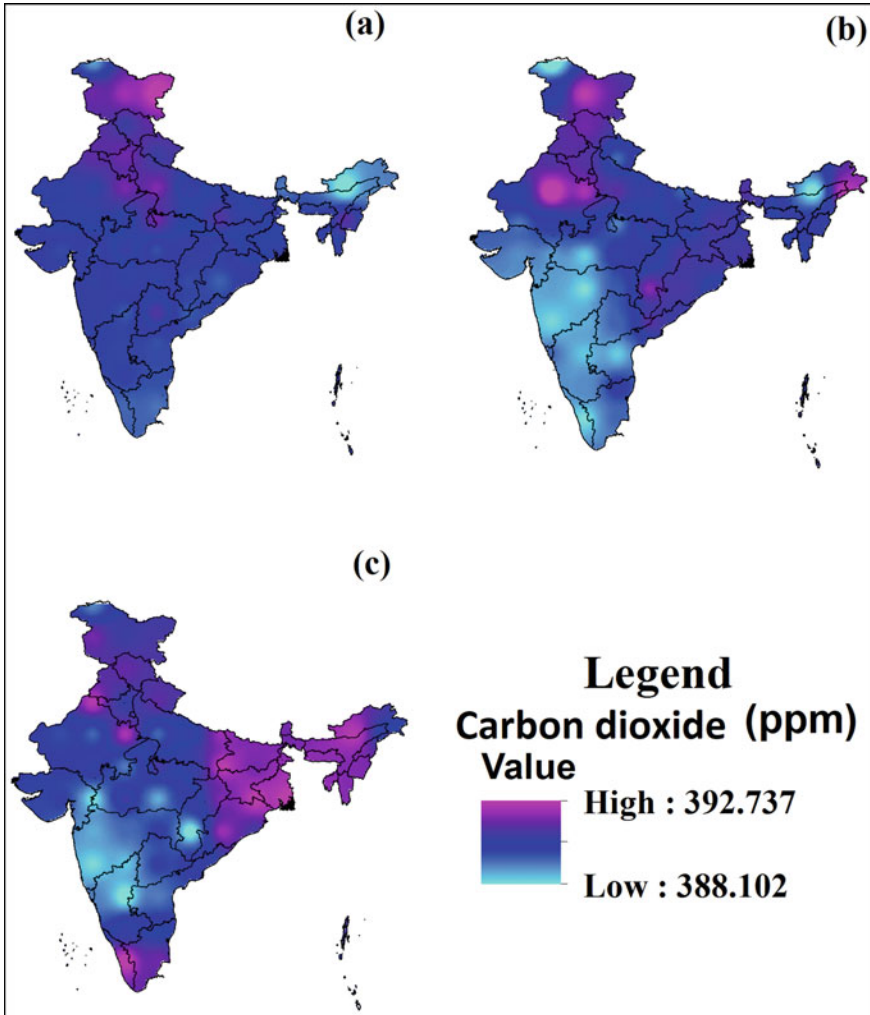


Fig. 4.2 Carbon dioxide concentration in the month of April in (a) 2005; (b) 2010; and (c) 2015

(26%), stroke and ischemic heart (17%), chronic pulmonary disease (WHO 2020). It is documented that 1.1 billion populations worldwide are forced to inhale toxic air (UNEP 2002).

Fortunately (from an environment perspective), global lockdown helps to rejuvenate the air quality. It positively affects the global climate by deducting the concentration of pollutants. The fatal virus threatens our life on one hand and gives the environment a chance to restore itself. So, the global perturbation about air pollution gives ample opportunities to scrutinize over the burning issues amidst the pandemic (Shehzad et al. 2020). Several studies reveal the reduction of pollutants

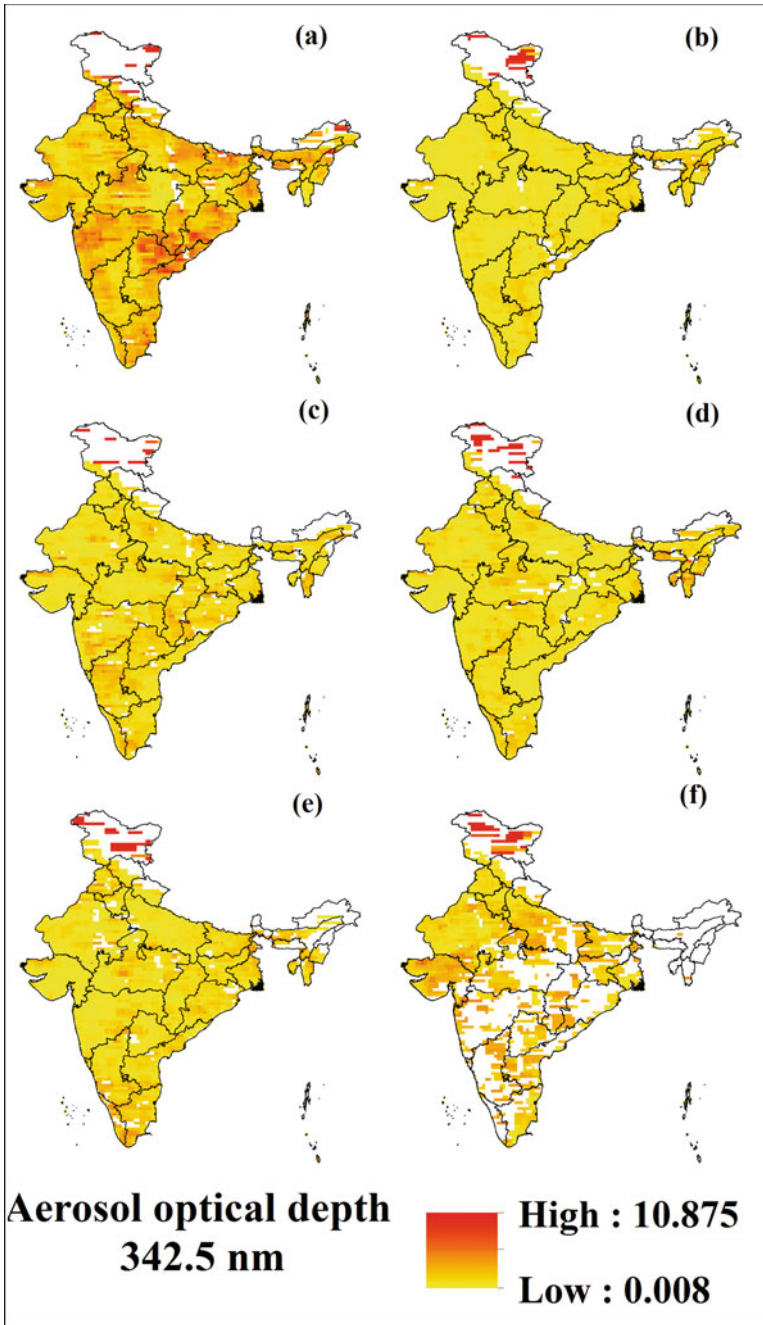


Fig. 4.3 Monthly aerosol concentration map during (a) January, (b) February, (c) March, (d) April, (e) May, and (f) June in 2020

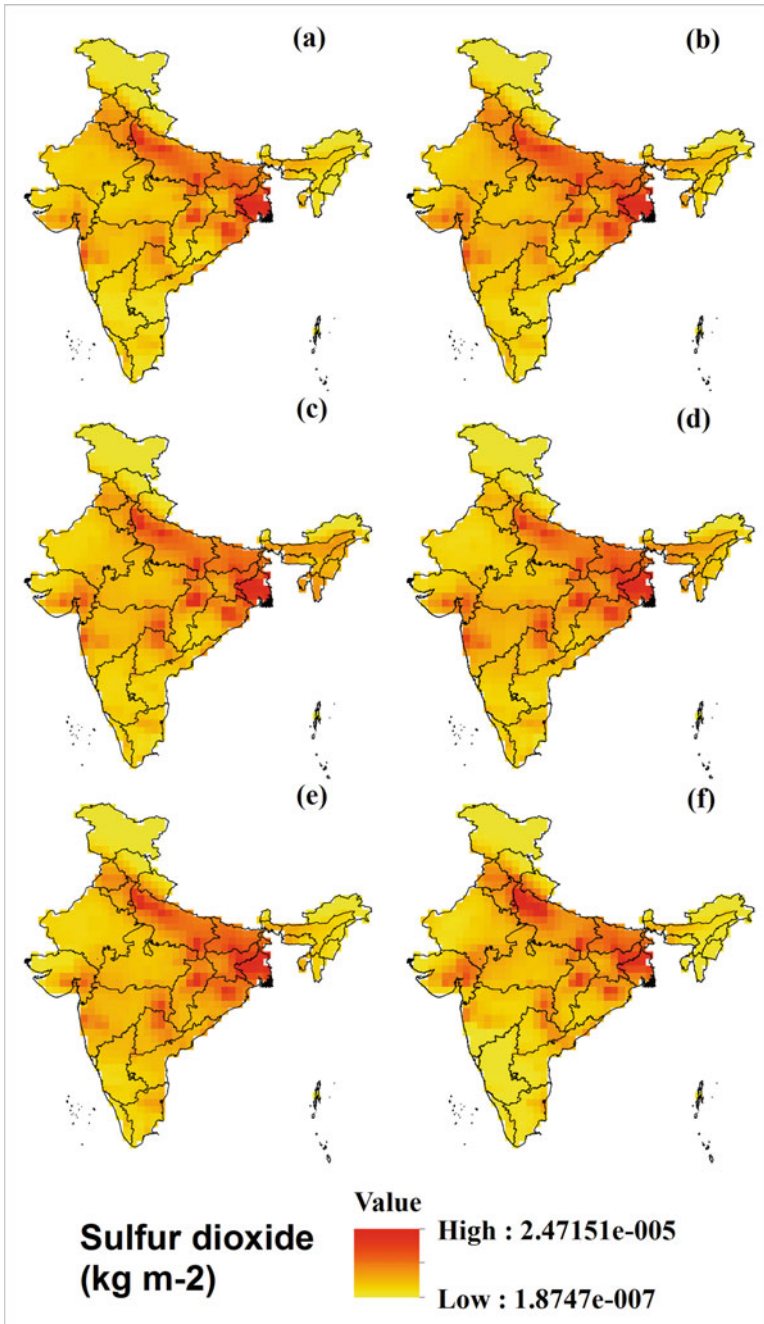


Fig. 4.4 Monthly Sulfur dioxide concentration map during (a) January, (b) February, (c) March, (d) April, (e) May, and (f) June in 2020

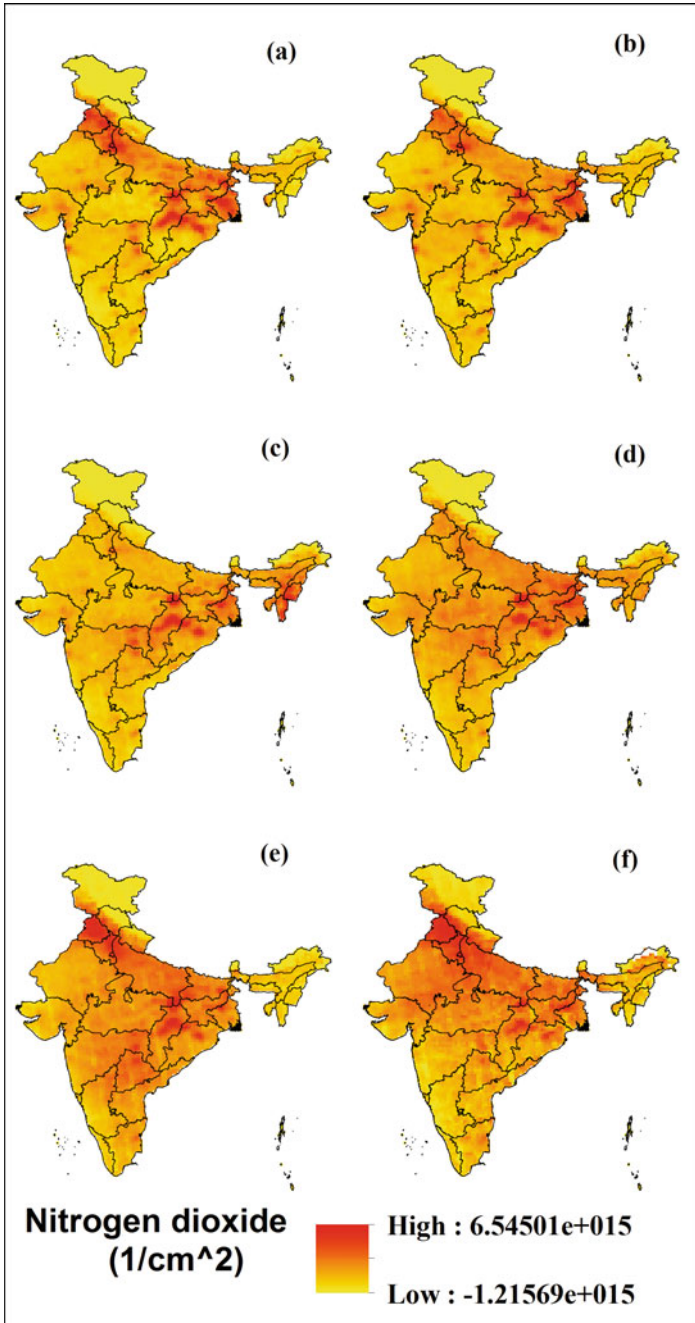


Fig. 4.5 Monthly Nitrogen dioxide concentration map during (a) January; (b) February; (c) March; (d) April; (e) May, and (f) June in 2020

level throughout the globe. A study conducted by Cadotte (2020) reveals the fact that air pollutants level has been diminished in major cities during the lockdown. NO₂ is reduced by 30% and carbon emission by 25% in China (Liu et al. 2015) during this phase. Analysis of Watts and Kommenda (2020), Coccia (2020), and Ogen (2020) also documented the same fact of reduction of air pollutants. The concentration of NO₂ has decreased by 12.1% between 1 and March 21, 2020; while in 2019, an increase was detected of NO₂ concentration by 0.8% during the same period (Biswal et al. 2020). COVID-19 induced lockdown has an awe-inspiring impact on the environment. The restricted human actions have offered nature, wildlife, and the natural ecosystem an excellent opportunity to move, flourish, and replenish. However, for a wider section of the population, the lockdown becomes a nightmare, putting a halt to their jobs. The country is in a perpetual debate, which the next section will focus.

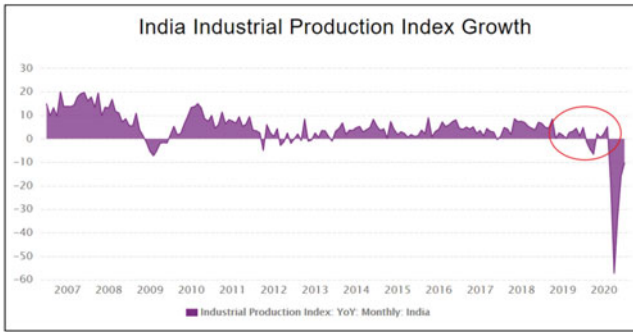
4.3 Turbulence in Economy

COVID-19 pandemic has misstruck the economy with varying degrees of impact across space and sectors. The pandemic's impact on the economy must be addressed considering the pre-COVID pandemic economy, the preparedness and resilience of the economy to fight against the shock of slowing down, and the measures taken during the pandemic situation. The analysis of the Indian economy amidst the pandemic ambience should be judged with the prelude that the GDP growth has been exhibiting a decelerated trend since 2015–2016 in the country. An inquisitive reader must be knowing that GDP is the final value of the product and services produced within the geographic boundaries of a state for a specified time interval. The nationwide lockdown costs havoc for the Indian economy, including its twenty-nine states and seven union territories. The impact of the COVID-19 pandemic is evident for the entire nation. However, the degree of impact has had varying magnitude across the states, depending on their economic structure, sectoral composition, and workforce.

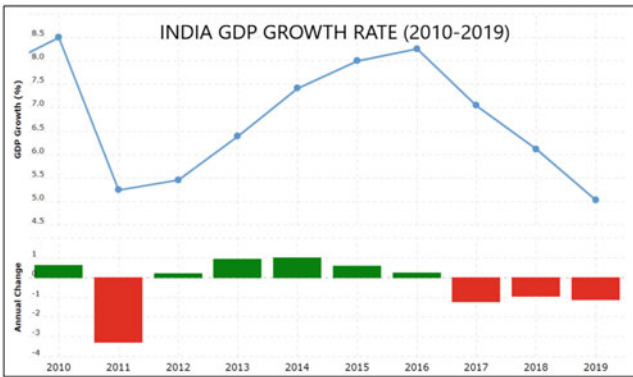
4.3.1 *Pre-lockdown Economy: Was It Tranquil?*

Let us concentrate on just a few years back—India's economic scenario clearly tells about the economic slowdown that has been considered a political debate rather than an economic in media houses. India's position as one of the fastest-growing economies from 2014–2017 in the world arena slips in 2018–2019 with reducing GDP growth rate. The indicators of national economic health in the form of GDP, Index for Industrial Production (IIP), investment rates, exports, imports, and government revenues ring the alarm bell (Fig. 4.6).

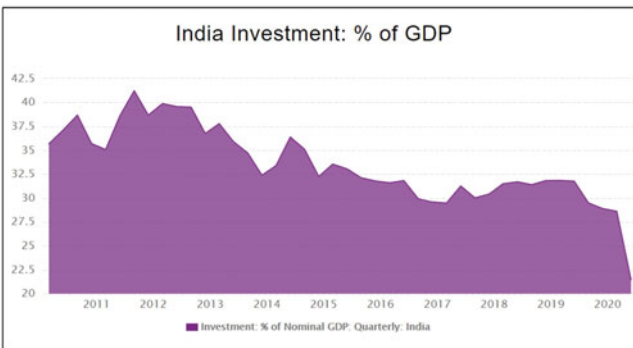
India's index for industrial production growth (Fig. 4.6a) has been denying a stable growth trend since 2011–2012, and in 2018 it declined sharply. The declining trend in



(a)

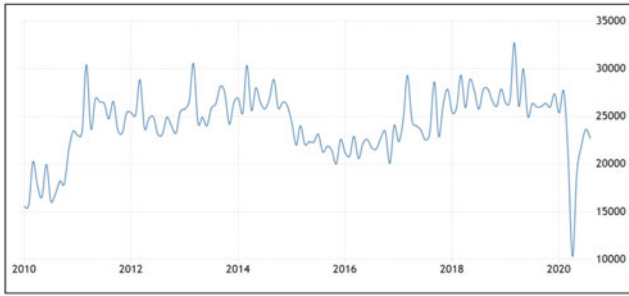


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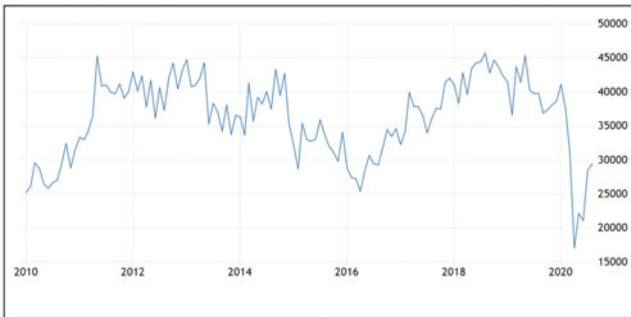


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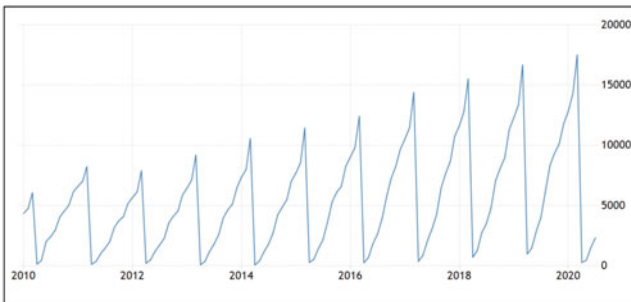
Fig. 4.6 (a) India industrial production index growth, 2006–2020; (b) India GDP growth rate, 2010–2019; (c) Growth in investment in India, 2010–2020; (d) India export status, 2010–2020; (e) India import status, 2010–2020; (f) Growth of govt. revenue in India, 2010–2020 (Source CEIC [CEIC Indicator dashboard is available under the URL: <https://www.ceicdata.com/en/indicators>] for a, b, and c; The Trading Economics Portal [Trading Economics Portal: <https://tradingeconomics.com/>] and Ministry of Commerce and Industry, Govt. of India for d, e, and f)



(d)



(e)



(f)

Fig. 4.6 (continued)

the economy’s output and fall in production affected employment and income. India’s GDP growth (Fig. 4.6b) has been continuously declining since 2016, whereas the investment rate also shows a reducing trend in investment in terms of the percentage of GDP since 2014. However, the export and import curve (Fig. 4.6d, e) express a healthier scenario comparatively, and the government revenue collection (Fig. 4.6f) gives some hope with its steady growth since 2010. There are several global and structural factors behind this economic turmoil, which include the very debated and controversial ‘demonetization,’ GST implementation and reforms in the taxation process in India, and so on since 2016. The Global Financial Crisis (GFC) sparked

the great recession worldwide and cost the economy worldwide. India was not an exception. The global demand and prices were reduced, which costs the export and investment in India severely. The corporates and small to large-scale companies were experiencing an environment of low demand, high-interest rate, the higher exchange rate of Indian currency, and slow growth that make them very difficult to pay the credit to the bank that was promised during the boom.

Decreasing the repayment capability of corporates leads to India’s Twin Balance Sheet problem. Reserve Bank of India (RBI) data shows the steady rise of non-performing assets (NFAs) since 2011 and a steep rise since 2015 with the highest peak in 2018. Due to capital infusion by the Govt. of India the NPAs ratio (Fig. 4.7) has shown a recovery in 2019 but still it stands at around 9% level. High magnitude frauds also contribute to the NFAs that limits the bank’s offer to new emerging small enterprises with more ease. The increasing proportion of the non-performing assets (NFAs) severely affects the bank’s capacity to grant further credit and lend. In December 2016, RBI introduced the Insolvency and Bankruptcy Code (IBC) as a recovery measure to NPAs, but it raises complexity. Despite this economic volatility and structural issues, the global oil price fall. An increase in the global demand and depreciation of the Indian rupee contributes some ray of hopes to the Indian economy. Diminishing consumer demand and lacking private investments are the key factors that affect economic growth. Moreover, the agricultural sector has been going through a battle against climate change and drought conditions in major parts of the country since 2014. With the demonetization, most of the savings for rural and small-scale enterprises have been taken away. In this overall crisis period with diminishing investment both in formal and informal sectors, the economic slowdown

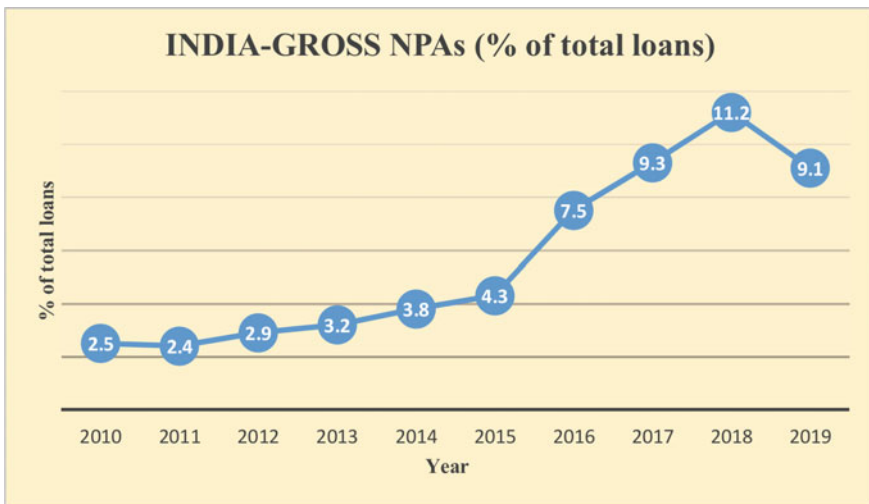


Fig. 4.7 Gross NPAs Growth in India for the period 2010–2019 (Source Prepared by the authors from the Ministry of Commerce and Industry, Govt. of India datasets)

was inevitable (Kotwal and Sen 2020). All these things manifest the pre-conditions in the Indian economy on which the surge.

4.3.2 COVID-19 Pandemic Impact on Economy

It's lockdown! No movement, no business, no sell! The production exchange, and consumption of all kinds of goods and services, except few extreme essentials, have been restricted due to an unprecedented COVID-19 pandemic situation. The worldwide COVID-19 pandemic affects the world economy badly. India is going through an extremely critical and crisis period in terms of economy and public health. The unemployment rate has sharply escalated during 2020 (Fig. 4.8b). The GDP shows the last 20 years lowest in 2020, slides from 5.02% in 2019 (Fig. 4.8a). The decelerated GDP rate must affect its three contributing components: consumption, investment, and external trade. The GDP share of different economic sectors is unique and unequal (Fig. 4.9) that may lead to variable degrees of pandemic impact on different economic sectors (Table 4.1). The impact of the COVID-19 pandemic is noticeable, but its severity varies across economic sectors and spaces. Indian economy is diverse, and the sectoral structure varies from state to state. The state-wise number of factories (Fig. 4.10) and the poverty condition (Fig. 4.11) has been taken to represent the pre-pandemic economic condition. Apart from this, the Gross State Domestic Production (GSDP) by different Indian states clearly shows the spatial inequality. The Indian states' GSDP share and state-wise COVID-19 status indicate that the 'sound' economy is affected most (Fig. 4.12). The GSDP share from different sectors is hugely different for different states (Fig. 4.13), and the states with greater dependency on industry, manufacture, and services have faced more severe impacts. In contrast, the states with more agriculture dependency are in comparatively stable economic conditions. Various states in India contribute to the economic growth of India in the manufacturing sector. However, five states: Tamil Nadu, Maharashtra, Gujrat, Uttar Pradesh, and Andhra Pradesh collectively hold around 53% of India's total factories (Fig. 4.10).

The state-wise COVID-19 epidemic data reveals that Maharashtra, Tamil Nadu, Delhi, Andhra Pradesh, and Karnataka are mostly affected (Fig. 4.13), followed by Uttar Pradesh, West Bengal, and Kerala. The demand-supply chain was disrupted by prolonged lockdown across the country and restrictions imposed on exchange globally.

4.3.3 Disruption in the Demand Side

Prolonged lockdown accelerates a situation of less transaction both in rural and urban areas, and it limits the desire of investment in non-essential goods and services by common people. Due to prolonged lockdown, non-regularity in banking transactions,

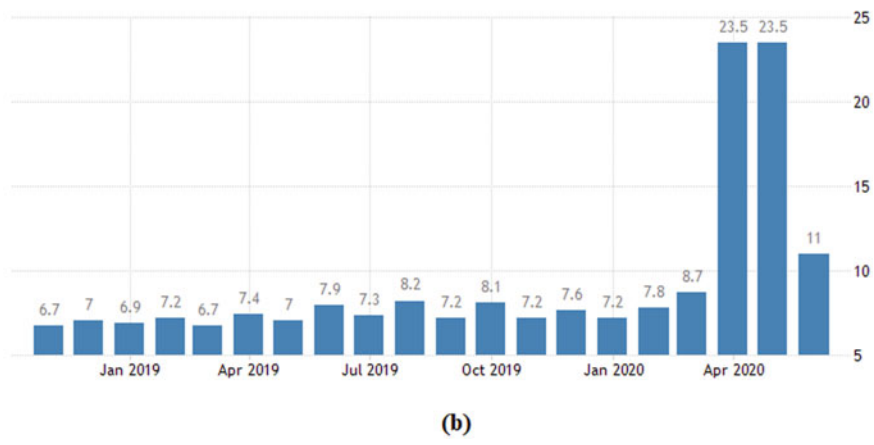
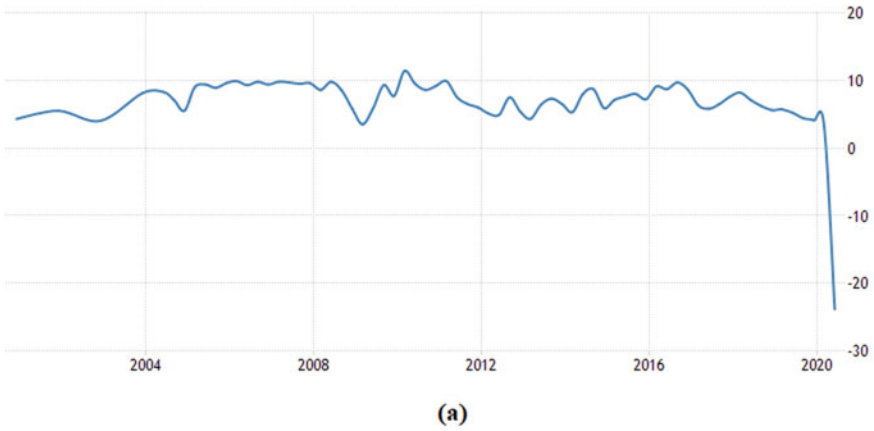


Fig. 4.8 (a) GDP growth rate from 2000–2020 (b) India unemployment rate 2018–2020 (Source The Trading Economics Portal & Centre for Monitoring Indian Economy CMIE [CMIE data portal on unemployment, URL: <https://unemploymentinindia.cmie.com/>])

uncertainty in job security across economic sectors limits the available cash in hand for common people. However, there is a decline and limited tendency to move outside in unlocking phases because of restrictions and risk of infection. Despite unlocking phases, there are also the provision of containment zones and a long way to wait for normalcy. This situation could lead to a sharp decline in the demand-side for non-essential investment and everyday life essential.

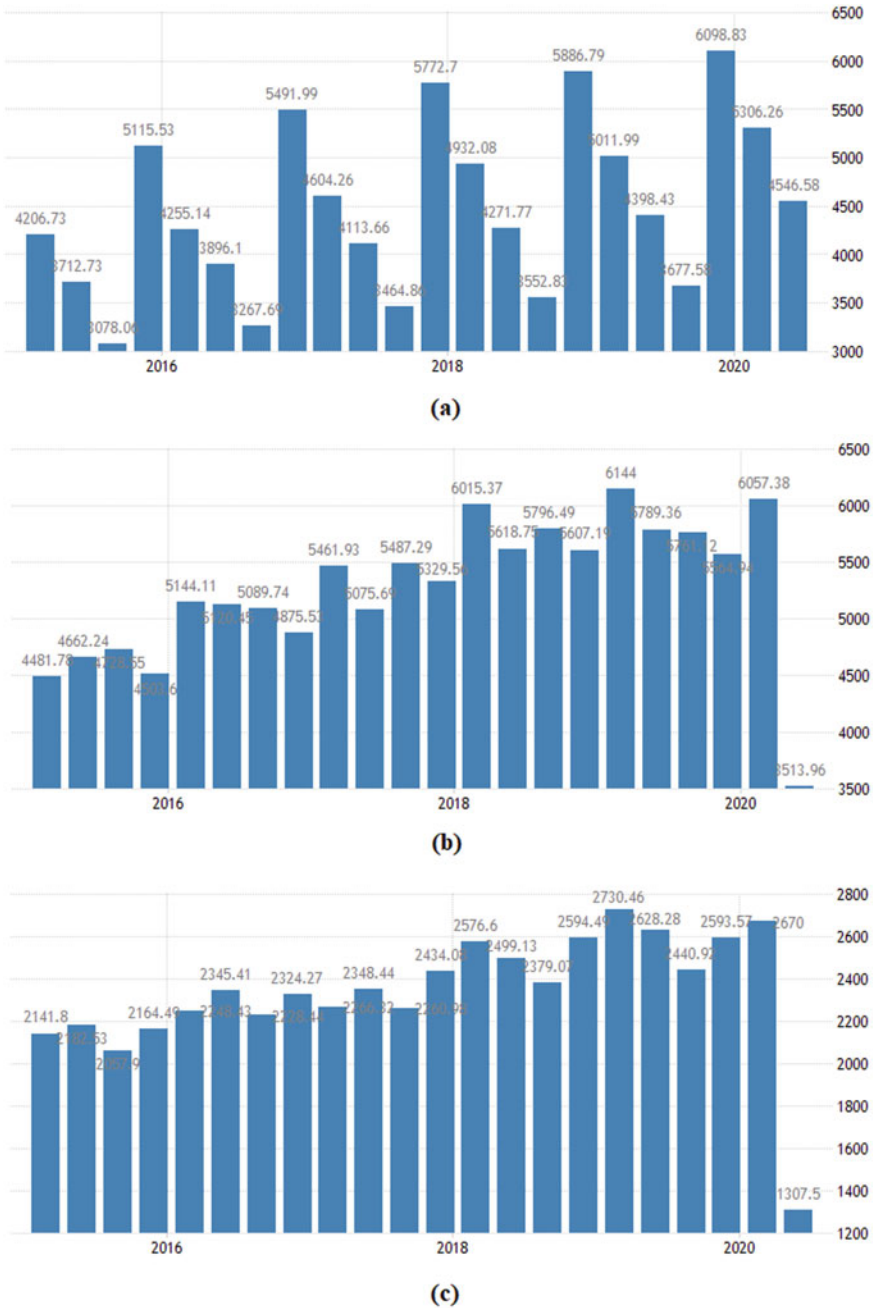


Fig. 4.9 GDP from (a) agriculture; (b) manufacturing, and (c) construction (Source The Trading Economics Portal [Trading Economics Portal: <https://tradingeconomics.com/>] and Ministry of Statistics and Programme Implementation, Government of India datasets)

Table 4.1 Economic sectors in India, leading states and their importance

Sector	Leading States	Importance
Food and agriculture	UP, West Bengal, Gujrat, Madhya Pradesh	The agricultural sector contributes 14.39% of GVA at constant prices and 15.87% at current prices for the service sector in 2018–19 ^a ; Considered as more than 58% of the Indian population’s primary source of livelihood
Micro, Small and Medium Enterprises (MSME)	Maharashtra, UP, Bihar, Tamil Nadu, Madhya Pradesh	Contributes 6.11% of manufacturing GDP and 24.63% of the GDP; the sector is served by more than 114 million people ^b
Apparel and textile	Maharashtra, Gujrat, Rajasthan, Punjab, Karnataka, Tamil Nadu, UP, Delhi, MP, Andhra Pradesh, West Bengal	Shares 2.3% of GDP and 7% of the manufacturing production; Employing more than 45 million direct jobs and a substantial amount of contract labors
Automobile	Maharashtra, Tamil Nadu, Gujrat, UP, Delhi, MP	Contributed 7.1% to the GDP with 49% of the country’s manufacturing GDP (FY 2015–2016)
Real estate	Maharashtra, Delhi, Tamil Nadu, UP, Gujrat	Expected to rise in market size of US\$1 trillion in 2013 from US\$1.72 billion in 2019 with a projected GDP contribution of 13% in 2025 ^c
Tourism and Hospitality	Kerala, Rajasthan, Goa, Punjab, Himachal Pradesh, Up, Gujarat, Karnataka, and West Bengal	Contributes 6.8% of the GDP in 2019 and supported 39.80 Mn jobs, which are around 8% of its total employment
Chemicals and Petrochemicals	Gujrat, Andhra Pradesh, Tamil Nadu, Orissa	Ranks 3rd in Asia and 6th in the world by sales value. ^d Huge untapped potential for export and in domestic consumption
Consumer, Retail and Online business	Delhi, Maharashtra, Tamil Nadu, UP, Gujrat	The retail industry shares 10% of the country’s GDP and around 8% of employment as per 2018–19 with rank as 5th largest global destination in the retail sector ^e
Education and Allied	All states	India is the 2nd largest E-learning market with an expectation to mark US\$1.96 billion by 2021, incorporating around 9.5 million users ^f

(continued)

Table 4.1 (continued)

Sector	Leading States	Importance
Financial service	All states	India has very diversified financial spaces that is undergoing rapid expansion through banking, insurance, co-operatives, stock exchange, and mutual funds, non-banking financial companies
Health service	Kerala, Punjab, Tamil Nadu, and Gujrat	The Healthcare sector in India is expected to achieve a limit of US\$372 billion by 2022. GDP share in healthcare service in India is only 1.6% in 2016 and Govt has targeted to reach 3% of GDP share by 2022 ^g
Metals and mining	Odisha, Andhra Pradesh, Rajasthan, Chhattisgarh, Jharkhand, Madhya Pradesh and Karnataka	Fast-growing world market, including Asia with GDP share of 2.5% of GVA at 2011–12 prices, for the third quarter in 2019–20. ^h It provides 23 lakh direct employment and 2.3 crores indirect employment ⁱ
Oil and gas	Assam, Gujarat, Rajasthan, Tamil Nadu, Arunachal Pradesh, Andhra Pradesh	India is the 3rd largest energy consumer after USA and China and among the eight major industries in India ^j with its extremely influential role in other economic sectors
Pharmaceuticals	Andhra Pradesh, Telangana, Maharashtra, Himachal Pradesh, Tamil Nadu, Karnataka, Gujrat, and West Bengal	India is considered the largest producer of generic medicines globally with around 20% share in global supply by volume and shows 10.72% export growth in 2018–19. ^k India supplies 62% of the global demand for vaccines ^l
Power	Dadra and Nagar Haveli, Daman & Diu, Goa, Gujrat, Punjab, Chhattisgarh	India is the 3rd largest producer and 3rd largest consumer of electricity in the world (Tripathi 2018) ^m
Telecommunications	Andhra Pradesh, Maharashtra & Goa, UP, Bihar & Jharkhand, MP, Chhattisgarh, Karnataka, Delhi	India is considered as the 2nd largest telecommunication market in the world with an expectation to reach the limit of 8.2% GDP share in 2020 ⁿ

(continued)

Table 4.1 (continued)

Sector	Leading States	Importance
Transport and logistics	Tamil Nadu, Telangana, Andhra Pradesh, Karnataka, Maharashtra	Rapidly growing sector with > 14% GDP share. And the unorganized sector is mainly accountable for the total sector valued of USD\$150 billion with around 99% contribution

^a<http://www.mospi.gov.in/central-statistics-office-cso-1>

^b<http://mospi.gov.in/nssso>

^c<https://www.ibef.org/>

^d<http://vibrantgujarat.com/>

^e<http://ficipi.in/>

^fwww.ibef.org

^g<https://www.ibef.org/>

^hAnnual Report, 2019–20, Ministry of Mines

ⁱKPMG Report 2020

^j<https://www.ibef.org/>

^k<https://www.investindia.gov.in/>

^l<https://www.investindia.gov.in/>

^mhttps://en.wikipedia.org/wiki/Electricity_sector_in_India

ⁿ<https://www.investindia.gov.in/sector/telecom>

^ohttps://lsc-india.com/content/overview_on_logistics_industry

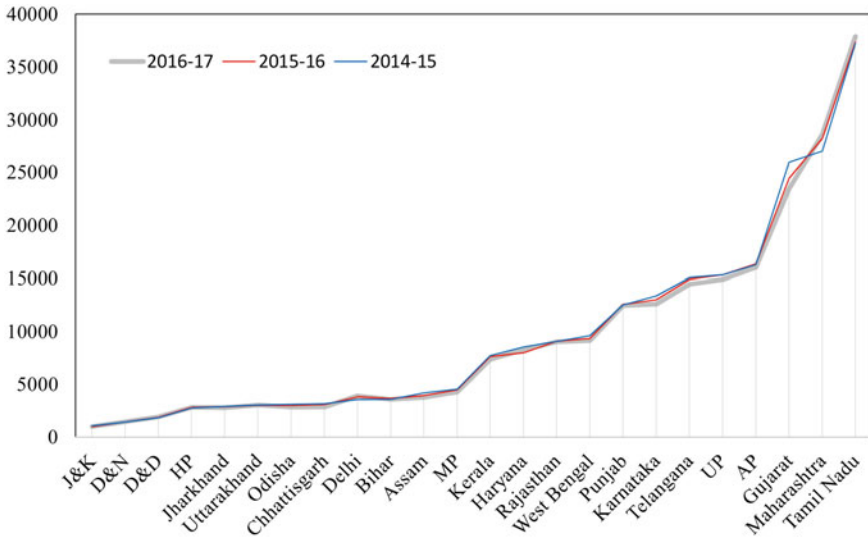


Fig. 4.10 State-wise number of factories in India (2014–2017)

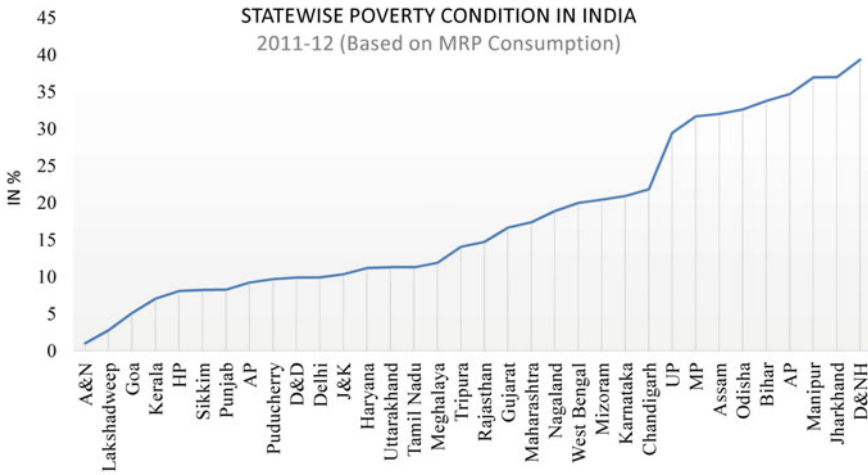


Fig. 4.11 State-wise poverty condition in India (2011–12 MRP Consumption) (Source Reserve Bank of India)

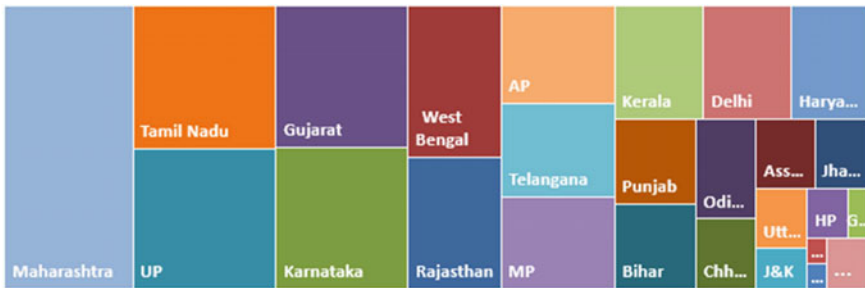


Fig. 4.12 India state-wise GDP volume (current price) 2016–17

4.3.4 Stagnation in the Supply-Side

Major import partners for India are China (16% of total imports), the United States (6% of total imports), United Arab Emirates (6% of total imports), Saudi Arabia (5% of total imports), and Switzerland (5% of total imports).¹ China’s Wuhan is the hot spot from where the deadly coronavirus has been outspread to the 188 countries with more than 31.6 million cases as of 23 September 2020. The USA is the worst affected nation with around 2 lakh deaths, and more than 6,800,000 confirmed cases due to COVID-19 pandemic. In this context, entry bans, the imposition of quarantine, restricted international exchange, the supply chain has totally disrupted. Besides, the India–China international border tension contributes more complexities in India–China trade relations. Electrical machinery and equipment, plastic, organic

¹<https://tradingeconomics.com/india/imports>.

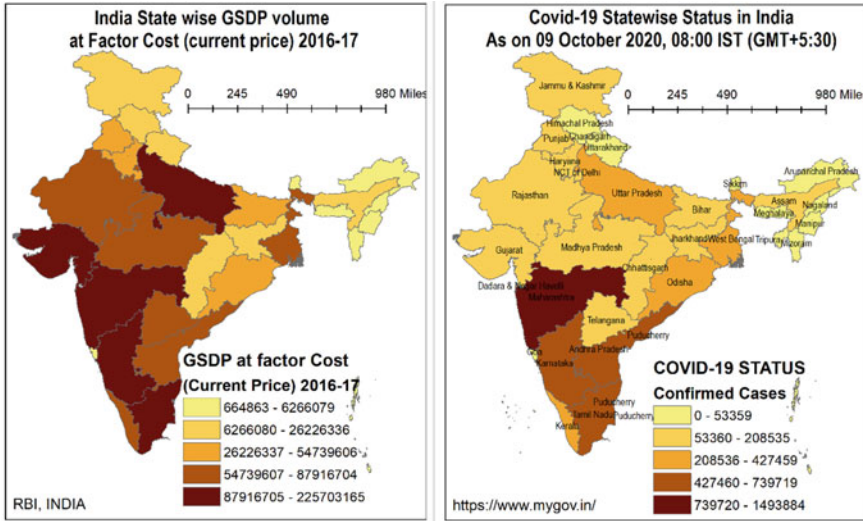


Fig. 4.13 India state-wise GSDP production and state-wise COVID-19 status

chemicals, fertilizers, machinery, and nuclear reactors are the commodities imported from China with the highest share. In 2019 India imported 60.9% of its total import from Asian countries and 15.9% of its purchase by value from European partners, followed by 9.2 and 8.1% supplied by North America and African countries. The sudden collapse of international import would have cost havoc to the Indian manufacturing economy and the supply side. The industries which mostly depend on foreign imported raw material are struggling very hard. The supply chain is also interrupted by huge reverse migration of migrant labourers to their native places, the containment zone restriction within states, irregular transport services, and numbers of masked factors. Labor intensive economic sectors face an unprecedented situation.

4.3.5 Persuading the Policies to Ground Realities

The worldwide economy, including the Indian economy, has been facing an unprecedented situation that has revolutionized the ongoing system in every sphere of life and livelihood. There is an ongoing debate on the advantage and disadvantages between the ethos of ‘Capitalism’ and ‘Socialism’—specifically, their guided mode of production and distribution system to cope with this crisis. However, evidently, both the systems have been affected depending on their effective preparedness, resilience, and exposure.

Analyzing the sector-wise impact of COVID-19 and the pandemic status across the states in India, it might be said that the North-Eastern states in India are in the least degree of risk. This is mostly because of their relative isolation in terms of different

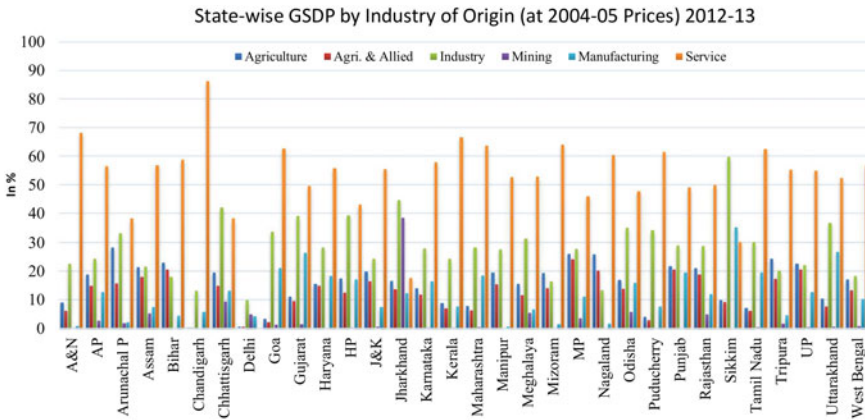


Fig. 4.14 India state-wise GSDP share from the industry of origin (at 204–05 prices) 2012–13

aspects of life and livelihood in comparison to the western and southern states. The lower GSDP share (Fig. 4.13), least market defined economic opportunities, and less exchange and movement have reduced the risk of rapid infection as well as the economy. The people of these states are comparatively more sensitive and conservative towards their society, culture, and traditions and, most importantly, have less exchange with the outside world. These factors contribute to some optimistic scenarios regarding the spread of the coronavirus in these locations. The agricultural sector is more resilient and shows stability with relatively less affected GDP share than industry, manufacture, and service. So, the states with greater dependence on the agricultural sector have a better opportunity to revive.

However, the western and southern part states, such as Maharashtra, Gujrat, Tamil Nadu, Kerala, Karnataka, are more dynamic and produce relatively high GSDP (Fig. 4.14) with more dependence on manufacture, industry, and service sector economy are affected most. Due to the suspension of activities contributing to industry, manufacture, and service, a vast number of migrants who were stranded outside their native places primarily have started to back home in different phases through different modes of transport even the country has witnessed the returning of migrant labor walking thousands of miles. The reverse migration would have a tremendous impact not only on demography but also on the economy. The interstate migration pattern in India varies across states and is mostly guided by their economy. The 2011 census data clearly shows that whereas Maharashtra, Delhi, and Gujrat are the largest receivers of interstate migrants, the state of Uttar Pradesh and Bihar have disproportionately largest number of out-migrants with 37% of total inter-state migrants (Chandramouli et al. 2011). The states of UP, Bihar, Madhya Pradesh, and Rajasthan collectively contribute around 505 of total inter-state migration (Chandramouli et al. 2011). The inter-state migration flow was reported to increase 45% from 2001 to 2011 (Chandramouli et al. 2011). It is obvious that on the verge of 2020, the flow must be increased at a large number. Hence, reverse migration hits

havoc the manufacture, industry, and service sector, whereas the in-migration in the recipient states greatly face undue pressure on economic structure.

But the crisis must provoke some opportunities. With the phase-wise unlock periods, the economy has been trying to get back in its path. Indian Govt. has already declared the Self-reliant India Initiative (*Atmanirvar Bharat Abhiyan*) package of twenty thousand crores with some key relief announcements for various economic sectors and practical initiatives to boost up the global supply chain in various sectors, reforms in several sectors, and relaxation in foreign investment rules. Most importantly, to make the country self-reliant, the Centre–state relation has to be redefined to make the state as self-sustaining economic territories in terms of energy, economy, food production, water, and environment. All the policy decisions must focus on more distribution principles rather than a concentrated focus toward the Centre. The way ahead of the pandemic era demands the federal economy in real sense along with good governance and smart fiscal discipline.

4.4 Conclusion

The COVID-19 pandemic has actually painted and presented some impossible scenarios in various aspects of life and livelihood. Whereas the natural environment has got a very positive impetus, but the economy and livelihood have been affected very badly. Millions of jobs have been lost; employment generation has been slowed down, shortage of available cash in hand has made serious constraints on the demand side, and the total production and distribution system has been paralyzed, leading to an unprecedented recession since the 1930s' great depression in the world economy. However, long-time mass confinement due to the nationwide lockdown has also reduced the atmosphere's pollutant concentration. A restricted mass movement, closure of industries, and drastic reduction of fossil fuel consumption make the natural environment purer to live, breathe, and sustain not only for humans but also for every species and wildlife on the planetary earth. The economy must move on; development must be targeted, but human civilization has to make some balance between environment and development, and the only way is 'sustainability'. Unfortunately, there is an immense probability of environmental exploitation in the post-COVID-19 pandemic situation. It shall not be wise to adulterate environmental safeguards and protection regulations to revive the economy and gear up the developmental works. The PARIVESH² portal data clearly shows that the Ministry of Environment, Forest, and Climate Change (MoEFCC) of India has approved 2604 proposals (85.6%) out of 3042 proposals submitted between July and October (October 7, 2020) for environment clearance, and it is highly alarming. Interference in bio-diversity hotspot areas around protected areas and wildlife sanctuaries should not be tolerated at any cost or for the sake of the developmental project. Being a developing nation, India has a huge burden and responsibility to flourish immense economic and developmental

²See: <https://parivesh.nic.in/>.

opportunities through significant investment in industry, manufacture, and service. However, at the same time, India also has the responsibility to balance competing needs. The very principles of sustainable development are the only way to follow and reestablish the man–environment nexus to sustain human civilization.

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Tanmoy Sarkar is an Assistant Professor in the Department of Geography of Gazole Mahavidyalaya (College) in Malda, West Bengal, India. The college is affiliated to the University of Gour Banga. Mr. Sarkar completed his postgraduate studies in Geography and Environment Management with a specialization in Remote Sensing & GIS at Vidyasagar University. His research chiefly focuses on soil erosion modeling, geospatial tools, and techniques in physical and human geography, and multi-criteria predictive models. He has been teaching Geographical Science at the undergraduate level for more than ten years. He has the working experience as investigators in different research projects, sponsored by DST and ICSSR. Mr. Sarkar has published three research papers in reputed journals, published by Springer Nature.

Jayanta Mondal is a State Aided College Teacher in the Department of Geography of Dr. Meghnad Saha College. The college is affiliated to the University of Gour Banga. Mr. Mondal completed his postgraduate studies in Geography at the University of Gour Banga. Further, he was assigned as a Research Assistant in ICSSR major project under the same department. His research interest is on environmental health monitoring and remedial simulations. He has hands-on experiences for four years in dealing with remote sensing on the geostatistical modeling.