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Environmental impacts of the Covid-19 pandemic on the world and Iran

Mohammad Yazdi*

Department of Geology, Faculty of Earth Sciences, Shahid Beheshti University, Tehran, Iran

ABSTRACT

The coronavirus disease or the so-called Covid-19 is a highly transmittable and pathogenic viral infection which emerged in Wuhan, China and spread rapidly around the world. The virus has resulted in about 4.2 million infections and 280,000 deaths (as of 10 May, 2020). Covid-19 is affecting not only health, economy, culture and life style but also it is going to affect the ecosystems and environment of the world. The ideas about role of this crisis in ecosystem and environment are quite different. Optimists believe that this crisis is the best opportunity to reduce pressure on natural resources and provides time for self-reconstruction of the ecosystems and environment. The pessimist, on the other hand, state that the positive effects of Covid-19 on the environment is not much and would diminish soon, and the earth is hurtling towards a catastrophe worse than the dinosaur extinction. The most positive impacts of this crisis are reduced pressure on natural resources, decreasing in air pollution and climate change, deeper understanding of the ecosystems and environment saving. The significant negative impacts of this crisis are human infection and death, billions USD in economic losses, increasing in household consumption, medicine, faces masks and medical gloves and challenge for burial of household and medical waste, reduction in environmental diplomacy, reduction in accuracy of weather forecasts and treat for wildlife infection. Iran is the home to the second most infected and recovered cases (up to 75%) after China. Several impacts have been reported on the human and natural environment of Iran. The virus has resulted in about 108,000 infections and 6,700 deaths (as of 10 May, 2020). In response to coronavirus, the government cancelled public events such as Friday prayers, festival celebrations, and sporting events, as well as closed schools, universities, shopping centers, bazaars, and even holy shrines. Consequently, the spread of infection is relatively controlled from over 200 to about 40 deaths per day. The impacts on the ecosystems and environment of Iran are similar to that reported in other parts of the world.

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*corresponding author.
E-mail address:
m-yazdi@sbu.ac.ir
(M. Yazdi)

1. Introduction

Coronaviruses are a group of related viruses that cause diseases in mammals and birds. In humans, coronaviruses cause respiratory tract infections that can range from mild to lethal. Coronaviruses are named after the Latin word corona, meaning “crown”. A coronavirus that originated in China led to the Severe Acute Respiratory Syndrome (SARS) outbreak in 2003 (Gongbo et al., 2017). Another coronavirus emerged in 2012 in Saudi Arabia causing Middle East Respiratory Syndrome (MERS).

The novel coronavirus responsible for this outbreak is known as SARS-COV-2 (Shereen et al., 2020). The illness caused by the virus is called Covid-19. Coronaviruses are large pleomorphic spherical particles with bulbous surface projections. Coronaviruses are minute in size (65–125 nm in diameter) and contain a single-stranded RNA as a nucleic material, size ranging from 26 to 32kbs in length (Shereen et al., 2020). The envelope is studded with projecting glycoproteins, and surrounds a core consisting of matrix protein (Fig. 1).

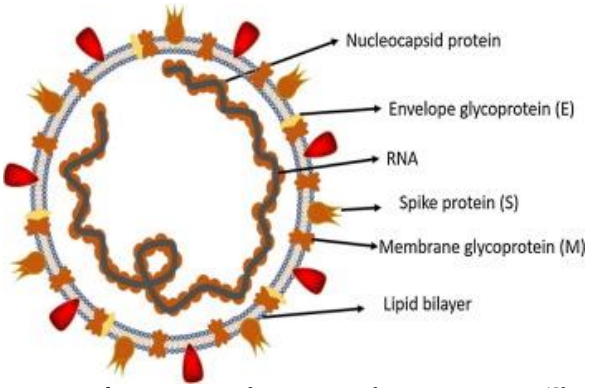

Fig. 1. Schematic structure of respiratory syndrome causing human coronavirus (Shereen et al., 2020).

The envelope glycoproteins are responsible for attachment to the host cell and also carry the main antigenic epitopes (Yaffe-Bellany, 2020). Historical reviews show that the Chinese population was infected with SARS in Guangdong province in 2003. SARS initially emerged in Guangdong, China and then spread rapidly around the globe with more than 8000 infected persons and 776 deceases (Guan et al., 2020). SARS infected 8098 individuals with mortality rate of 9%, across 26 countries in the world. A decade later in 2012, a couple of Saudi Arabian nationals were diagnosed to be infected with another coronavirus (MERS). Recently at the end of 2019, Wuhan of China experienced an outbreak of a novel coronavirus that killed more than 18000 and infected over 70.000 individuals within the first 50 days of the epidemic with mortality rate of 2.9% (McMahon, 2020). The outbreak was initiated from the Hunan seafood market such as bats, frogs, snakes, birds, marmots and rabbits (Yaffe-Bellany, 2020).

The observations indicated a human to the human spreading capability of this virus, which was subsequently reported on every continent except Antarctica. The human to the human spreading of the virus occurs due to close contact with an infected person, exposed to coughing, sneezing, respiratory droplets or aerosols. These aerosols can penetrate the human body (lungs) via inhalation through the nose or mouth. The intermediate source of origin and transfer to humans is not known, however, the rapid human to human transfer has been confirmed widely. About 4,200,000 people around the world were affected by coronavirus and about 280,000 people have died, till date of this writing (as of 10 May, 2020). The coronavirus pandemic is a tragedy and has affected human life very badly, overloaded hospitals, unemployment, due to the coronavirus prices of food products have been increased in many countries, economic disaster and it has caused depression, the stress in millions of people and many countries around the world have lockdown and quarantined its citizens to slow down the spread of the virus (Yaffe-Bellany, 2020).

2. Material and Methods

We live in an age in which intersecting crises are being lifted to a global scale, with unseen levels of environmental degradation and climate destabilization, as well as health threats (Yaffe-Bellany, 2020). Understanding how Covid-19 is affecting the ecosystem and different sectors of the environment is of vital importance. There are not yet too many scientific researches about role the virus as a catalyst or inhibitor of different sectors of the ecosystem and environment. The ideas about role of this crisis in various indoor and outdoor environments are quite different. The environmental has suffered from the Covid-19 crisis and has created benefits also. During this crisis, new questions concerning the impacts of the Covid-19 were developed as most of the issues needed further investigations. Based on the systematic classification devised in sections2- 1 and 2-2 different aspects of Covid-19 crises were discussed as follow. The data were used in this article is mainly based on statistics which was obtained from reputable websites such as WHO, UNEP, Iran's MHME and IRNA. The paper is dealing to evaluate the negative and positive impacts of this crisis not only in the ecosystem and environment of the world but also in the ecosystem and environment of the Iran. It is important to note that Iran is home to the second most infected country after China (WHO, 2020) and evaluating of the negative

and positive impacts of this crisis in the ecosystem and environment of Iran is too important.

3. Results and discussion

3.1. Negative impacts

There are not a variety of scientific researches about Covid-19's negative role in the different sectors of the environment or for understanding the virus' potential role in shaping our environment. The crisis not only directly threatens human lives, but also it is real challenge for the ecosystem. It can be evaluating several typical negative impacts for the ecosystem and different sectors of the environment. The current laboratory data show that the survival of this virus varying indoor environments factors such as temperature, humidity. The natural life cycle of the virus involves long-distance dissemination mainly in outdoor environments. Therefore, the negative impacts of the virus depend on to indoor and outdoor environments factors. The most negative impacts can be categorized such as human cost, household consumption, medical consumption and …

3.1.1. Human cost

The first negative (the most important) impact of the Covid-19 is human cost of the coronavirus outbreak. The World Health Organization has declared Covid-19 as the outbreak a pandemic and it has spread to more than 210 countries around the world. The human cost of the coronavirus outbreak is more than 4,000,000 cases and 280,000 deaths confirmed globally (WHO, 2020). It is the biggest worldwide death after Second World War. The human cost of the Covid-19 in Iran is more than 108,000 cases and 6,700 deaths (MHME, 2020). The data is updated on the time of writing of the paper on as of 10 May, 2020. The second human cost of the Covid-19 is that it hit more the poor peoples at least half of the world's population. The poor families have to pay for health care and lockdown of business hit their life too. The coronavirus outbreak act as poverty multipliers and is forcing their life into extreme poverty not only worldwide but also in Iran.

3.1.2. Increasing of household consumption

The third negative impact of the Covid-19 is that led people to consume more water, electricity, household energy (such as gas), food, hygiene and even medicine. Quarantine and staying home longer is increasing of turning on the heating and electricity system for longer hours. This will increase household energy consumption and produce more gas from this sector. One of the main problems is the increase in water and detergent consumption in indoor environment. Excessive use of water causes more sewage to be produced. Increasing wastewater will further threaten groundwater resources and reduce drinking water resources. Multiple uses of detergents around the globe dramatically increase the phosphate and nitrate of surface water. Due to the abundance of nutrients, algae and aquatic plants grow unusually and cause the wetlands to dry up, and on the other hand, by preventing sunlight from entering the aquatic ecosystems, they destroy their entire vital cycle, too. Imagine that with these huge changes in the pattern of detergent consumption around the world, if this trend continues, we will see many ecosystem changes in aquatic environments. The coronavirus outbreak act increase in water and detergent consumption in Iran such as other parts of the world. Tehran's water consumption increased from 2.5 million cubic meters before coronavirus outbreak to 3.5 million cubic meters on March 20 (Fig. 2). It was unprecedented in the last 50 years. It is equal to most water consumption in the highest summer heat time (TPWW, 2020). The water resource of Iran is too limited. Therefore, excessive water consumption and increasing wastewater are threatening groundwater resources of Iran. The World Health Organization (WHO) stated that it is impossible to become infected with coronavirus through water and the risk of infection of water supply systems is low. But the presence of coronavirus in water was detected during routine tests in four of 27 samples. How the coronavirus got into industrial water is not known (WHO, 2020).

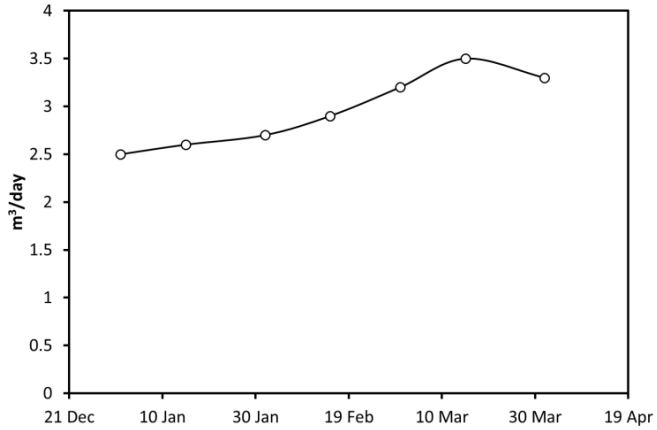

Fig. 2. Tehran's water consumption increasing after coronavirus outbreak (TPWW, 2020).

3.1.3. Challenge for burial of household and medical waste

Another negative impact of the Covid-19 is that led people to use of more medicine, significant numbers of face masks and medical gloves. As a consequence of the unprecedented use of disposable face masks and medical gloves adding to the worldwide burden of plastic waste. Another problem is that some health centers do not pay attention to the protocols of collecting, disinfecting and disposing of medical and hospital waste. Also, some peoples do not pay attention to collecting and disinfecting of medical waste. Failure to pay attention to the accumulation of infectious and domestic waste may lead to polluting and unsanitary of nature and a second wave of epidemics. The most medical center and peoples in the developed cities of Iran have attention to the protocols of collecting, disinfecting and disposing of medical and hospital wastes (MHME, 2020). For example, Isfahan municipal (the second biggest city of Iran) give to people special bag of rubbish marked in red for collecting of medical household wastes (IRNA, 2020). The cleaners are aware of the contaminated waste when collecting the waste from the doors of the houses. Another concern is the pollution caused by the burial of the dead in cemeteries. Liquid limestone and disinfectants are used during the burial. Also, the bodies are buried at a depth of about two meters. In this conditions and wastewater rich in detergents and antiseptics kills the virus in less than minute. The Covid-19 virus has a fat coating and is only activated in the living organism. When the fat coating is removed, the virus also disappears. It removes by heat above 50 degrees, alcohol, detergents, oxygenated water, liquid limestone and any liquid that has alkaline properties (Yazdi, 2020). Therefore, in this conditions household and medical waste are relatively safe for infection.

3.1.4. Wildlife infection

There are concerns that the virus could be transmitted to animals in the now and future. There is no significant evidence that human coronaviruses can be transmitted by animals. There are other concerns as to whether it is possible to transmit the virus to animals in the future. From an infection control viewpoint, it is already well known that the most infections source of virus is common urban, parks and gardens. Also, legal and illegal wildlife (both live and in parts) are as the most probable source of the virus. Recent reports show that dogs and domestic cats are probably infected by Covid-19. If this proves to be the case, we will have to wait for a big disaster in the farming and poultry industry, pets and even wildlife. There is no infection report from Iran wildlife yet (MHME, 2020). We had badly experiences such as bird and swine flu on the past about wildlife. Also, chlorine disinfectants threaten aquatic plants and wildlife in two ways. First, chlorine directly oxidizes to destroy cells or proteins. Second, chemical compounds in disinfectants combine with other substances to become hazardous substances. In surface waters, the decomposition of organic matter is very intense. For this reason, these compounds lead to the synthesis of by-products such as tri-halo-methane and halo-acetic acid. These compounds are very dangerous for aquatic organisms. In addition, disinfectants are converted to chloramine and Nitro-sodium methylamine, known as carcinogens. All of them are too harmful for aquatic plants and wildlife of the world as well as for Iran ecosystem.

3.1.5. Reduction in accuracy of weather forecasts

The other negative impact of the Covid-19 is that led to reduction in accuracy of worldwide weather forecasts. The European Centre for Medium-Range Weather Forecasts (ECMWF) announced that a worldwide reduction in aircraft flights due to the pandemic could impact the accuracy of weather forecasts, citing commercial airlines' use of Aircraft Meteorological Data Relay (AMDAR) as an integral contribution to weather forecast accuracy (Damian, 2020). The ECMWF predicted that AMDAR coverage would decrease by 65% or more due to the drop in commercial flights (IEA, 2020).

3.1.6. Reduction in environmental diplomacy

The Covid-19 pandemic has also impacted environmental iplomacy and climate diplomacy, as the 2020 United Nations Climate Change Conference was postponed to 2021 (Newburger, 2020). The pandemic also limits the ability of countries, particularly developing countries with low state capacity, would see global warming as a lower priority issue than the pandemic and that a desire to "restart" the global economy would cause an excess in extra greenhouse gas production (UNEP, 2020).

3.1.7. Economic impact

Covid-19 will have the greatest negative impact on the economy of all countries. It seems that this year will be one of the worst years of the economic situation for all country and Iran. It is set to cause the steepest fall in global GDP (up to 5-6%) since the Second World War. According to forecasts, different countries will spend about 10% of their GDP to deal with Corona. The government is facing a severe budget deficit; disrupting the subsidy payment process. This might imply a danger of future inflation and unemployment, more damage to the life of poor peoples (UNEP, 2020). There is some concern about future effects of environmental policy, global markets and investments. Cheap oil may slow the transition to cleaner energy and green investments. The oil prices usually lead to more travel, more production, and more harmful emissions. The preliminary data suggests that cheap oil could actually lead some companies to decide that renewable sources like wind and solar are a safer investment in a world of unstable oil prices (Izvorski et al., 2020).

3.2. Positive impacts

The worldwide disruption caused by the 2019–20 coronavirus pandemic has resulted in numerous impacts on the ecosystem and environment. News channels and social media feeds are quick to point out the negatives impacts of Corona's crisis, but it has actually resulted in a bunch of positive impacts for our ecosystem and environment (Watts and Kommenda, 2020). We are still at the beginning of the road and it is not possible to accurately assess the consequences of Corona crises on the ecosystem and environment. The most positive impacts can be categorized such as reduction in air pollution, decreasing in greenhouse gas, climate change and ….

3.2.1. Self-awareness

The first positive (the most important) impact of the Covid-19 may lead to a deeper understanding of the ties that bind us all on a global scale and could help us get to grips with the largest public health threat of the century and the ecosystem and environment crisis. There is no denying the fact that coronavirus has had catastrophic impacts on mankind. However, it has surely given the environment a chance to self-heal and reclaim what belongs to nature. The first principle of ecology is that every action in nature has a reaction. The second principle says that no creature in nature disappears, but changes from one state to another. Corona's crisis demonstrated the legitimacy of these two laws, and what a catastrophe it is for mankind to be overly involved in nature and its unnatural behavior, such as eating animals such as bats. Now, the general public all realize how important it is to follow natural and ecological laws. Any major disaster in the ecosystem, such as the irrational, unnatural, and illegal eating of animals such as bats, could be a catastrophe for the human in the all parts of the world. Before this crises, we have never had thought about the way we are treating the environment and the scarce natural resources. However, now when due to lock down we are forced to stay back home, almost all of us have ample time to think and reflect on our actions. We have now become aware about how we have been wasting water while bathing and brushing, wasting electricity by keeping laptops, computers, televisions on just to save the time and effort of switching them on and off time

and again and a lot of similar things (UNEP, 2020). We have found ourselves guilty of having wasted so much food, so much paper and obviously so many natural resources. This guilt of self-realization is helping mankind to eradicate all the wrong that has been done (TGC, 2020). People have become conscious about what they eat. People now are trying to eat more fruits and vegetables. Many have said good bye to meat while others have temporarily paused consumption of non-vegetarian food. People are being forced by the nature to opt for dietary options that are relevant from the view point of sustainable development. This is again a positive indicator as far as health of environment is concerned (TGC, 2020).

3.2.2. Decreasing in climate change

Understanding how Covid-19 is affecting the climate crisis is of vital importance. There are not a variety of scientific research and addressing Covid-19's role as a catalyst or inhibitor of climate change. Due to the coronavirus outbreak's impact on travel and industry, many regions experienced a drop in air pollution. Reducing air pollution can reduce climate change. However, reductions in emissions due to lockdown and quarantine are short time. The countries would attempt to return to previous rates of economic growth and would supply chain disruptions in the energy that will worsen its environmental impact. Therefore, it seems that reduce climate change is temporary (UNEP, 2020). Many countries around the world have implemented lockdown and quarantine to slow down the spread of the virus and due to this flights have cancelled, now there are a lot less planes in the sky and no vehicles on the streets meaning a lot less air pollution and greenhouse gases being emitted and air quality has improved significantly and the earth's ozone layer is also recovering. NASA uses an ozone monitoring instrument (OMI) to analyze and observe the ozone layer and pollutants such as NO_2, aerosols and others (Julian, 2009). According to NASA scientists, the drop in NO_2 pollution began in Wuhan, China and slowly spread to the rest of the world (Fig. 3 and Fig. 4). One example is New York. Researchers have found that there has been a 5- to 10% drop in air pollutants like carbon dioxide in New York. Methane emissions have also dropped significantly (UNEP, 2020).

3.2.3. Decreasing in air pollution

The environmental crisis has also benefited from the Corona Crisis in some areas. One of the main impacts of the coronavirus outbreak is a significant drop in the air pollution and appeared blue sky which has been reported in many parts of the world such as Iran, China and Italy. Over the decades gone, most of the cities around the world actually forgot the color of the sky. To the kids of new generation, we had literally no real time example to prove that the color of the sky is blue as each time we looked up the sky appeared to be gloomy and filled with smoke (UNEP, 2020). Today, when the production of almost everything is on halt and factories are no longer as active as they used to be, the emission of smoke has lessened which has resulted in clear sky, the blue one as we had known it since we were born. Increase in number of flights, not only increased air traffic and air pollution but also the threat the life of birds. Every time we looked u towards the sky all that we could see were fewer birds and more airplanes flying. After travel restrictions due to spread of coronavirus, birds have begun to spread their wings once again in the blue sky (TGC, 2020). A drop in air pollution was first observed by NASA in China's Hubei province, where the coronavirus outbreak began in December 2019 (Fig. 6). The reduction in air traffic, oil refining, coal consumption and quarantines, travel bans resulted in a 25 percent reduction of carbon emission in China. In the first month of lockdowns, China produced approximately 200 million metric tons of carbon dioxide less than the same period in 2019. Earth systems scientist estimated that this reduction of air pollution may have saved at least 77,000 lives (UNEP, 2020). Italy is the most infected country in Europe. The European Space Agency's Sentinel-5 satellite shows that air pollution levels, especially nitrogen dioxide gas compounds, have dropped across Italy. Between 1 January and 11 March 2020, the European Space Agency observed a marked decline in nitrous oxide emissions from cars, power plants, and factories in the Po Valley region in northern Italy, coinciding with lockdowns in the region (Green, 2020). That's probably why a quarter or more of the country's carbon dioxide emissions have been eliminated (Conticini et al., 2020). Also, the average level of nitrogen dioxide, which is closely related to fossil fuel consumption, was

36 percent lower this week than in the same period last year.

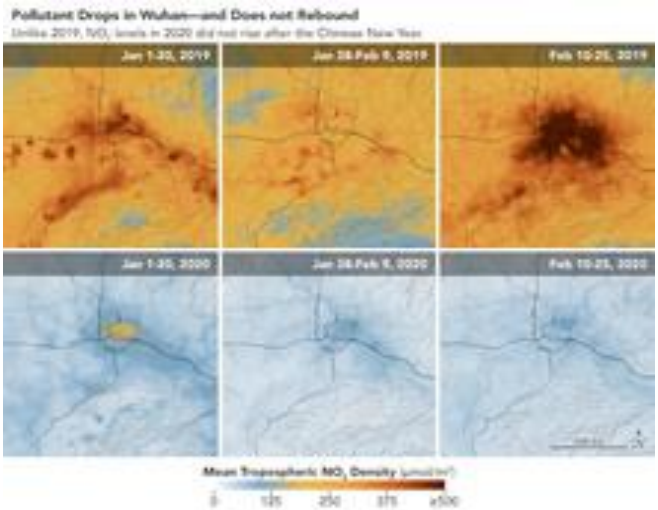

Fig. 3. Images from the NASA Earth Observatory show a stark drop in pollution in Wuhan, China, when comparing NO_2 levels in early 2019 (top) and early 2020 (bottom) (Image from Earth Observatory, 2020).

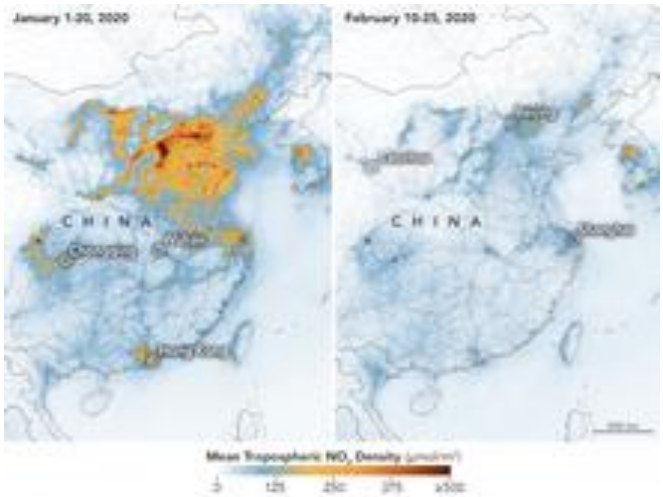

Fig. 4. TROPOMI data shows the NO_2 levels in China, beginning of 2020. (Image from Earth Observatory, 2020).

The report showed that a small increase in long-term exposure to particulate matter (PM2.5) leads to a large increase in corona death rate. An increase of just 1 microgram per cubic meter in PM2.5 increases the Covid-19 death rate by 15%, with a confidence interval of 95% (CI) (WHO, 2020). Iran is the most infected country in the Middle East, yet. The decline in industrial activity, ban on travel, home and social quarantines, the restriction of traffic dropped air pollution levels in some cities and regions of the Iran (MHME, 2020). Tehran is the most crowded and polluted city of Iran. The air pollution in the city is related to cars (61%) and resident sources such as home and industrial (39%). Decline in industrial activity, the ban on travel, home and social quarantines, the restriction of traffic, the air cleared fairly in the city which has not seen before during the last 10 years ago (Fig. 5). But, statistical data for the March-April of 2020 show was not as clean as last year (2019). The data shows that during the March, many industries were active in the south of Tehran (Tehran Air Quality Control Company, 2020). Wind from the south of Tehran was transferred this air pollution. The increase in pollution from resident sources can also be cited as another reason when the number of vehicles in the city was very low. According to Iranian calendar, the first day of spring (March, 21) is known as the Persian New Year (so called Nowruz). The country is in full holidays for 5 days (21-26 March) and peoples are traveling too much. The data show that fuel consumption in the 21-26 March of 2019 was about 100 million liters per day. The fuel consumption has decreased to 46.6 million

liters per day in the21-26 March of 2020. The compared data to the same period last year shows that gasoline consumption has decreased by about 46.5% (IRNA, 2020). This amount of decreasing in the gasoline consumption has the main role in reduction of air pollution in Iran.

Fig. 5. The reduction in motor vehicle traffic has led to a drop in air pollution levels. Moddares highway in center of Tehran, Iran, on 25 March, 2020 (IRNA, 2020).

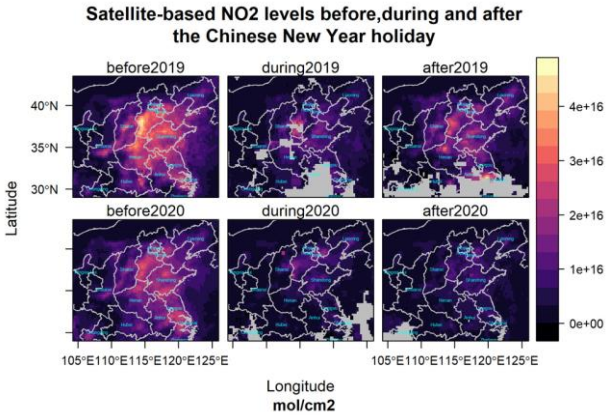

Fig. 6. Average atmospheric levels of NO2 (molecules per centimeter squared) measured by the NASA OMI instrument (NASA, 2020).

3.2.4. Reduced pressure on natural resources

To combat coronavirus, companies have asked workers to work from home. This has reduced vehicles on road. In addition to this, the consumption of plastic has also reduced as people no longer have tea or coffee in those disposable glasses. Also, they now print less and shop less. In one way or the other, all of this is contributing towards the good health of the environment. The widespread use of online education, meetings and commerce led to a decline in paper consumption. The paperless world led to save many forests for the environment. In Iran, many educational, business, scientific and family meeting are taking place online. This has forced the country to build both data capacity and new application technologies such as native applications. If this is managed properly, after the end of the Corona crisis, there will be a tremendous and extraordinary opportunity for the country to expand paperless trade and education. The paperless world led to save many forests for the environment Iran which is too poor for forest. Another unexpected effect on the environment from the coronavirus has been seen in Venice, Italy (Srikanth, 2020). The water in the canals cleared and experienced an increased presence of fish and waterfowl. The increase in water clarity was due to the settling of sediment that is disturbed by boat traffic and mentioned the decrease in air pollution along the waterways (NASA, 2020).

3.3. Ecosystem results

In recent decades, zoonotic diseases (75%) have gained international attention such as Ebola, bird flu, swine flu, MERS, SARS, and now, the Covid-19. It is clear that these zoonotic diseases are closely interlinked with the health of ecosystems and environment (WHO, 2020). In the last century, a

combination of population growth and human activities have resulted in major changes in the ecosystems and environment such as greenhouse gas emissions, global warming and Climate change. Human and animal populations are increasing migration, urbanization, changing dietary preferences, trade demands, and travel. This has led to the expansion of cropland and more intense livestock farming near and around cities, increasing opportunities for exposure. Livestock often serve as an epidemiological bridge between wildlife and human infections (UNEP, 2020). The novel coronavirus originated from the Hunan seafood market at Wuhan, China where bats, snakes, raccoon dogs, palm civets, and other animals are sold, and rapidly spread up to all countries. The crisis is going to make the biggest disaster for 21th century and may result death of 300,000 innocent peoples in the world. The Covid-19 is resulted by human interaction in the ecosystems and environment. It will not only affect the human environment, but also the natural environment.The most positive impacts of this crisis are reduced pressure on natural resources, decreasing in air pollution and climate change, deeper understanding of the ecosystems and environment saving. There is an abundance of ideas that the rising of global temperatures and climate change is the cause of the Covid-19 pandemic. There is a not accurate research that climate change is significantly affecting the spread of the disease. Although, we were worsening the climate crisis by destroying biodiversity, natural habitats and facilitate the emergence and spread of this new diseases. The reduced economic activity would help decrease global warming, air and marine pollution, allowing the ecosystems and environment to slowly flourish. Preliminary studies have shown that carbon monoxide, which is mainly produced by cars, has been reduced by almost 50 percent compared to 2019. Production of CO_2, which contributes to global warming through climate change, has declined in recent days (UNEP, 2020). There is correlation between air pollution and the number of deaths from Covid-19. Air Quality Index (AQI) is based on concentration values for up to 5 key pollutants, including: PM_{10}, $PM_{2.5}$, O_3, SO_2 and NO_2. According to the AQI the area covering Lombardi and Emilia Romagna in north of Italy results to be the most polluted area in Italy. The data show that lethality rate in northern regions of Italy is 12% and in the rest of the country is around 4.5% (Green, 2020). The researchers suggest that air pollution and relatively older populations is another possible factor that could explain this variation. The significant negative impacts of this crisis are human infection and death, billions USD in economic losses, increasing in household consumption, medicine, faces masks and medical gloves and challenge for burial of household and medical waste. Also, reduction in environmental diplomacy, reduction in accuracy of weather forecasts and treat for wildlife infection are other negative impacts of this crisis. The Covid-19 crisis made significant reductions in greenhouse emissions due to lockdown and quarantine. However, it seems that this reduction is short time impact. The countries would attempt to return to previous rates of economic growth and would supply chain disruptions in the energy that will worsen its environmental impact. Iran is home of the second most infected country after China. The Covid-19 has spread to Iran on 19 February 2020, when Chinese businessman and students had travelled to the country. In the short time since the Covid-19 crisis began, several impacts have been reported in the human and natural environment of Iran (Yazdi, 2020). The virus has resulted more than 108, 000 infections and 6,700 deaths, on the time of writing of the paper (as of 10 May, 2020). In response to the coronavirus, the government cancelled public events such as Friday prayers, festival celebrations, sporting events, including football matches and closed schools, universities, shopping centers, bazaars, and even holy shrines (Wright, 2020). The Ministry of Health and Medical Education (MOHME) data show that the share of each place in the Covid-19 infections is as: schools=12%, universities=6%, offices= 3.5%, Friday prayers= 0.02%, holy shrines= 0.04%, public transport= 26% and stores and small business= 22%. But they banned celebration in even Friday prayers and holy shrines. Now, they could control infection spread from 200 to 40 death per day on the time of writing of the paper (as of 10 May, 2020) (Fig. 7 & 8). Iran is second country after China in the number of recovered cases up to 75% (IRNA, 2020). Several negative and positive impacts in the natural environment of Iran have been reported (Yazdi, 2020). The impacts are similar to that

reported in other parts of the world. The human infection and death, economic failure, increasing in household consumption, medicine, faces masks and medical gloves, drinking water (up to 30%) and challenge in burial of household and medical waste are the significant negative environmental impacts. The reduced pressure on natural resources, decreasing in air pollution and climate change, reduction in accidents up to 60%, life style changing (50% reduce consumption of red meat), increase in paperless education and business activities, deeper understanding of the ecosystems and environment saving are the significant positive environmental impacts (Amazonaws, 2020).

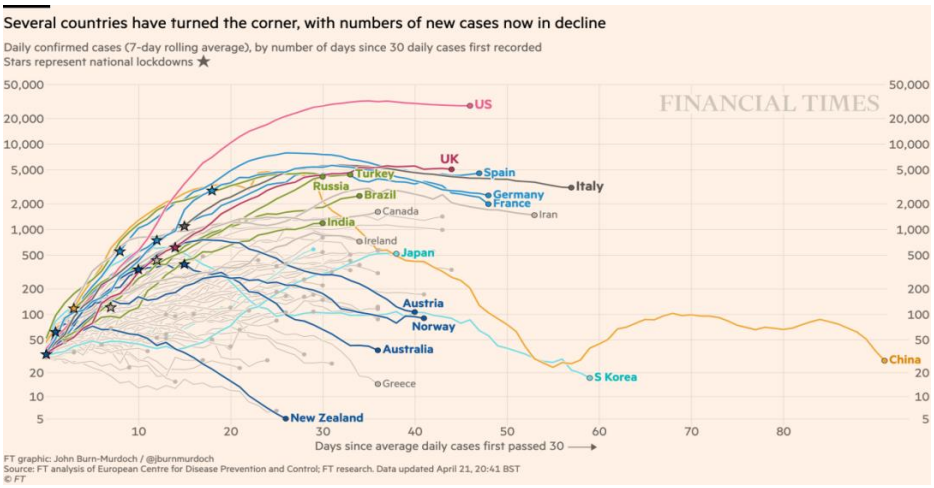

Fig. 7. Decline in new cases of Covid-19 in Iran and other several countries (Amazonaws, 2020).

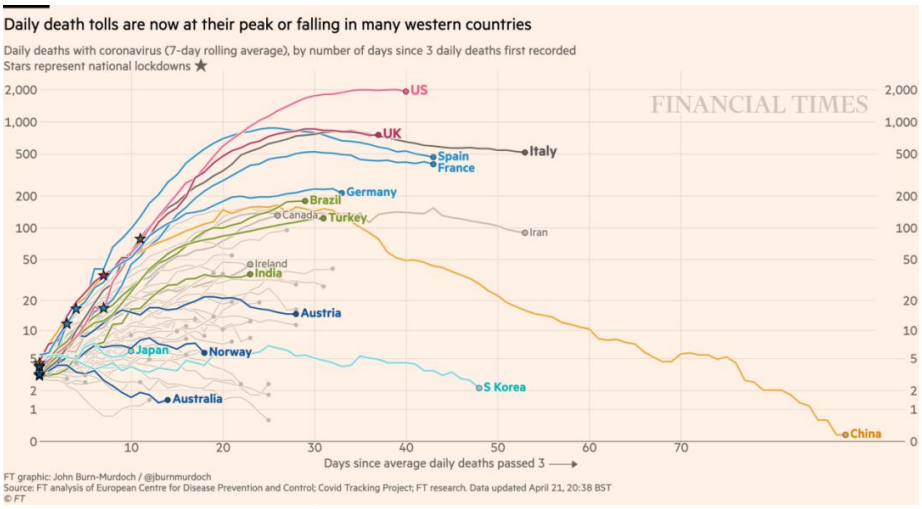

Fig. 8. Decline in daily deaths of Covid-19 in Iran and other several countries (Amazonaws, 2020).

4. Conclusion

Covid-19 crisis is recognizing the close relationships between human, animal, ecosystems and environment. It means that the increase in the ecosystems and environment destruction is directly affected by the spread of pandemics diseases such as Covid-19. The rapid spread of this disease has affected almost every country in the world as well as Iran and has locked down the human life. The Covid-19 will not only affect the human environment, but also the natural environment. Many environmentalists are happy that the coronavirus has caused positive changes in the ecosystems and environment, especially the reduction in air pollution and greenhouse gas emissions. Despite a temporary decline in global carbon emissions due to the reduction in air traffic, oil refining, and coal consumption, the decrease in emissions due to lockdown and quarantine seem to be short-lived. After the end of crisis, countries would attempt to return to previous rates of economic growth and would supply chain disruptions in the energy that will worsen its environmental impact. Though the crisis of Covid-19 seems to be huge, but it will pass by. It is important to learn

that the human activities would result in major changes and destroy the ecosystems and environment. If we don't take care of our ecosystems and environment, it is clear that Covid-19 will not be the last pandemic.

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