



Assessment of the impact of COVID-19 on transportation and its inter-linked sectors of Nepal

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Abstract

Nepal being a landlocked country is completely dependent on the roadways and airways for means of transportation however, the railway has not been started in Nepal to date. Transportation is interlinked with mobility and due to lockdown every sector related to mobility has been affected. Consequently, the aviation sector has been worst hit as airlines were prohibited to operate. The aviation industry of Nepal has foreseen significant decadence in the mobility of passengers and cargo (international and domestic) which has affected revenue generation. Similarly, the imposed lockdown has influenced the ongoing nation's pride and the long-term investment projects which have been considered as a milestone in the infrastructural development of Nepal and those projects need to be reprogrammed and reprioritized. Moreover, the sharp decrease in import of petroleum products has decreased the revenue paid to the Indian Oil Corporation (IOC) which will help to reduce trade loss. The lockdown induced due to COVID-19 has also affected the agricultural sector as the supply chain has been disrupted due to travel restrictions. The overall Gross Domestic Product (GDP) that the transport and its inter-linked sector contribute has been reduced during lockdown than the preceding years. Identifying the paucity of research in the transportation sector of Nepal this paper is focused on the comprehensive study of the impact of the COVID-19 transportation sector along with its inter-connected areas.

Keywords: COVID-19; GDP; lockdown; Nepal; modes of transportation.

1. Introduction

Late in December 2019, a novel infectious disease was recognized in the Wuhan province of China which later on was named COVID-19 (Wang et al., 2020). After its outbreak in most of the provinces in China, WHO in January 2020 confirmed it as a communicable disease transferring via respiratory droplets, and on January 30th WHO declared a worldwide public health emergency (Zhou et al., 2020). Spreading in most of the European countries like Italy, France, COVID-19 turns into a pandemic, and to avoid its spread, most of the countries imposed lockdown (Euronews, 2020). As of 16 February 2020 Globally 108,822,960 people have

been infected whereas 2,403,641 have died from this virus (WHO, 2020). In Nepal, till 16 February 272,945 were infected whereas 269,303 people were recovered and 2,055 have died (MOHP, 2020). To stop the spread of infection lockdown was imposed around the world including Nepal. As lockdown has been imposed it has disrupted the mobility of goods and people around the globe ultimately affecting the GDP contributed by the transportation sector. Alike transportation, the construction industry is also affected thus increasing the unemployment rate. Due to the pandemic, the U.S. reported the least number of jobs in April 2020 associated with the construction industry (BLS, 2020). The construction industry which provided 7.7% of employment globally before the pandemic is expected to fall significantly (ILO, 2020). In India, a survey conducted by the Centre for Monitoring Indian Economy (CMIE) revealed that the weekly unemployment rate associated with daily wage laborers dropped from 39% to 26.4 % between March to May of 2020 (Barbate et al., 2021). In the development of transport sector of Nepal where many constraints such as lack of integrated coordination, the need for huge investment, uneven changes in topography were pre-existed, this virus has even worsened the pace of development activities. This study was undertaken to dig-out the repercussion of COVID-19 in transport and its interlinked sectors.

2. Methodology

The methodology for this study incorporates four stages: Literature review, Collection of Primary and Secondary data, Analysis and graphical representation of available data, and Impact assessment. During the literature review, previously published journal articles and reports from World Health Organization (WHO), United Nations Development Programme (UNDP), International Labour Organization (ILO), Asian Development Bank (ADB), International Civil Aviation Organization (ICAO), and International Air Transport Association (IATA) have been reviewed and many information has been extracted. After the literature review, it is found that no study has been conducted to analyze the impact of COVID-19 on transportation and its-interlinked sectors of Nepal. So this research aims to fill the literature gap.

2.1. Primary Data Collection

For this study, primary data were collected from the official governing bodies like the CAAN (data of international and domestic passengers, international and domestic Cargo and revenue generated), Nepal Oil Corporation (data of petroleum products and revenue paid to IOC). Moreover, primary data related to agriculture (dairy, vegetables, and poultry) and its revenue were extracted from concerned ministries and departments such as the Ministry of Agriculture and Livestock Development (MoALD), Department of Customs (DoC), Central Bureau of Statistics (CBS), and Nepal Rastra Bank (NRB).

2.2. Secondary Data Collection

Different newspaper articles and interviews with the concerned personnel from Nepal Oil Corporation (NOC), Department of Roads (DoR), and Tribhuvan International Airport (TIA) have been taken as a secondary source of many facts in this paper.

3. Literature Review

Transportation and mobility are interlinked with the economy: from tourism to hospitality, industry to agriculture, all are badly affected thus leading to a significant downfall in the overall economy of the world. In the best-case scenario of the COVID-19 outbreak for 2020, which is characterized as two months of a travel ban and a dramatic decrease in domestic demand, the monetary loss of global GDP is estimated to be around USD 76.7 billion. Moreover, the global GDP is expected to lose around USD 346.98 billion in the

worst-case scenario, described as the six months of the travel ban (Duffin, 2020). Asian Development Bank (ADB) states that if the effect of this pandemic persists for two months in the transportation sector, there will be a sharp decline in domestic demand, and GDP will fall between \$77 billion to \$347 billion (ADB, 2020). On five continents represented by the International Road Transport Union (IRU) and its affiliates, nearly 3.5 million road transport operators are facing an extremely serious financial impact. Likewise, the Asia Pacific region has lost 379 billion revenues from road transport which accounts for a 20% reduction than in 2019. Similarly, Europe, North America, South America, and Eurasia have lost revenue from the transport sector by 20%, 12%, 20%, and 18% respectively (IRU, 2020). The aviation industry contributes 3.6% of the GDP of the world economy and most aviation experts afraid of its downfall (IATA, 2021). Before COVID-19, more than a hundred thousand commercial flights used to be scheduled and around 12 million passengers travel around the globe but this pandemic has completely halted scheduled flights except for evacuation, medical supplies, and emergency. There will be a 35% to 65% decline in passengers around the world in 2020 (IATA, 2021). Alone in Asia and Pacific, there will be a downfall of around 234 to 414 million passengers which accounts for 38% to 70% and revenue of 48 to 86 billion will be lost (ICAO, 2020). Travel restriction has also affected road transport. In Bolivia, there is a 20.7%, 18.8%, 5.37%, and 98.59% of reduction in movement of the passenger by road transport in January, February, March, and April 2020 respectively (Rivera, 2020). Whereas in Spain, as travel restriction was adopted, a 65% of reduction in traffic volume was observed (ETSC, 2020). Likewise, in Greece, the traffic in the first week of March has been decreased by around 10% and till the first week of April, it has been decreased by 75%. Whereas, in the Kingdom of Saudi Arabia till the first week of March, traffic have been plummeted to 20% and to 50% till the first week of April (Katrakazas et al., 2020). As soon as the countries around the world impose lockdown petroleum and oil industries in Saudi Arabia (leading exporter of petroleum products) have faced the steepest one-day price crash nearly in 30 years (Nicola et al., 2020). Whereas in United States (U.S.) crude oil price dipped to negative from \$18 per barrel to -\$38 per barrel¹. International Energy Agency (IEA) reported that the revenue generated from the Oil and Gas will fall between 50% to 85% than in 2019 (IRE, 2020). The transportation and construction sectors in Nepal have an overall contribution of 15% to the national GDP. Furthermore, the construction industry provides 13.87% of employment while transportation provides 4.5% of employment but this year the data will fall than in preceding years and (UNDP, 2020).

4. Findings

Nepal, a landlocked nation trying to elevate from the status of the Least Developed Country, is highly vulnerable to the emerging COVID-19 pandemic. The effect of the global pandemic is immense and is now taking a significant toll on an economy that depends heavily on the construction and transportation sector, agriculture, and import of petroleum products.

4.1. Road and Construction

Most suitable and productive months for construction work in Nepal have been adversely affected by this pandemic and mostly all the construction works are halted. As Nepal already holds a financial gap of 12.77% of GDP (MoF, 2020), the aim of Nepal to graduate from Least Developed Country (LDC) by 2022 and aim to achieve Sustainable development Goals (SDG's) by 2030 is affected by COVID-19 leading to an expansion in duration. The extension (most probably from 6 months to 1 year) of undergoing nation pride projects such as Kathmandu-Terai/Madesh expressway, Nagdhunga tunnel construction, Kali-Gandaki Corridor, Pushpalal highway, Postal highway, Madan Bhandari highway is likely to occur. However, even

¹ Based on news published on The Guardian. (<https://www.theguardian.com/world/2020/apr/20/oil-prices-sink-to-20-year-low-as-un-sounds-alarm-on-to-covid-19-relief-fund>).

during pandemic adopting the full safety and precaution in the construction site and using limited materials and manpower, construction of these projects were continued². Despite the lockdown Department of Road (DoR) blacktopped 77 Km roads in Kathmandu Valley and underlaid 121.6 Km of gravel road. In addition to that, the Department of Roads opened 36.75 km of new road, and maintenance of 52.30 Km of the road was conducted across the country. During the lockdown, one-third of the total (about 2000) projects targeted by the Department of Roads were under construction and 21 bridges were constructed successfully during the lockdown period³. In 2018, the construction sector of Nepal recruited 978,000 employees and has been increasing at an average rate of 9% per year (CBS, 2019). Thus it can be estimated that the pre-pandemic employment figures may have been around 1.2 million. Moreover in between February to May around 500,000 contractual and Indian workers are employed in the construction industry. Based on this data nearly 1.7 million people were employed in the construction sector when lockdown started. Among 1.7 million, 300,000 were hired on regular payrolls and 5% of them were hired by contractors that received the government permission to run on even during the lockdown and remaining 95% have lost the job during lockdown. A total of 1.4 million people were unemployed in the construction sector during lockdown (Prasai S., 2020).

4.2. Aviation

Due to COVID-19, in the fiscal year 2075/76, The Civil Aviation Authority of Nepal has experienced a reduction of 42.5% on its targeted revenue of 8.33 billion. As of November 2020, domestic and international passengers have been declined by 65% and 72% respectively than in 2019. Due to this reduction in movement of passengers (domestic and international) CAAN has lost 5.96 billion in revenue which accounts for a reduction by 80% than in 2019. Furthermore, the fund worth of 2.21 billion which was targeted for Airport development was reduced by 37.55%. (CAAN, 2020).

4.2.1. International passengers and revenue collected

From January 2017 to October 2018, the outgoing number of international passengers has increased by 17.55% and the incoming number of international passengers has been increased by 54.49%. But after October 2018 to July 2019 the number of outgoing passengers has been decreased by 13.39% whereas incoming passenger has been decreased by 18.58%. From July 2019 to November 2019, outgoing international passengers were increased by 49.54% and incoming international passengers were increased by 22.06% (Fig. 1)). Whereas the number of incoming and outgoing international passengers between March to July 2020 i.e. during lockdown time has been decreased (Fig. 2). Till April there is no movement of the incoming international passenger whereas 18,178 more passengers were recorded in July than in May. Moreover, the outgoing number of international passengers has fluctuated which is because of evacuation flights operated from different Embassies for respective citizens. From March to June 4,553 outgoing passengers were recorded which has been decreased by 3,218 in July 2020. The revenue collected in March 2020 has been decreased by 52.20% than in March 2019¹ and the revenue collected in July 2020 has been decreased by 96.85% than in July 2019.

4.2.2. Domestic passengers and revenue collected

From 2017 to March 2020 the incoming domestic passenger has been increased by 34.56% and the outgoing passenger has been increased by 52.68%. After March 2020 there has been a drastic decrease in the movement

² Based on articles published on different newspaper. (<https://thehimalayantimes.com/nepal/nagdhunga-tunnel-construction-begins-in-full-swing-amid-covid-19-crisis>), (<https://www.newbusinessage.com/Articles/view/12802>).

³ Based on interview published on The Himalayan Times with Er. Keshab Sharma, Director General, Department of Road. (<https://thehimalayantimes.com/business/department-of-roads-blacktops-77-kilometre-road-during-lockdown/>).

of domestic passengers. The number of outgoing domestic passengers between February and March has been decreased by 23.21%, and incoming domestic passengers in the same period have been decreased by 27.02% (Fig. 3). Due to the decrease in movement of domestic passengers the revenue generated has also been decreased by 91.77%. After 24th March, there is no movement of domestic passengers as the complete lockdown was imposed and because of which no revenue was generated during that period. The revenue collected in March 2020 has been decreased by 72.43% than in March 2019 and the revenue collected in July 2020 has been decreased by 98.89% than in July 2019.

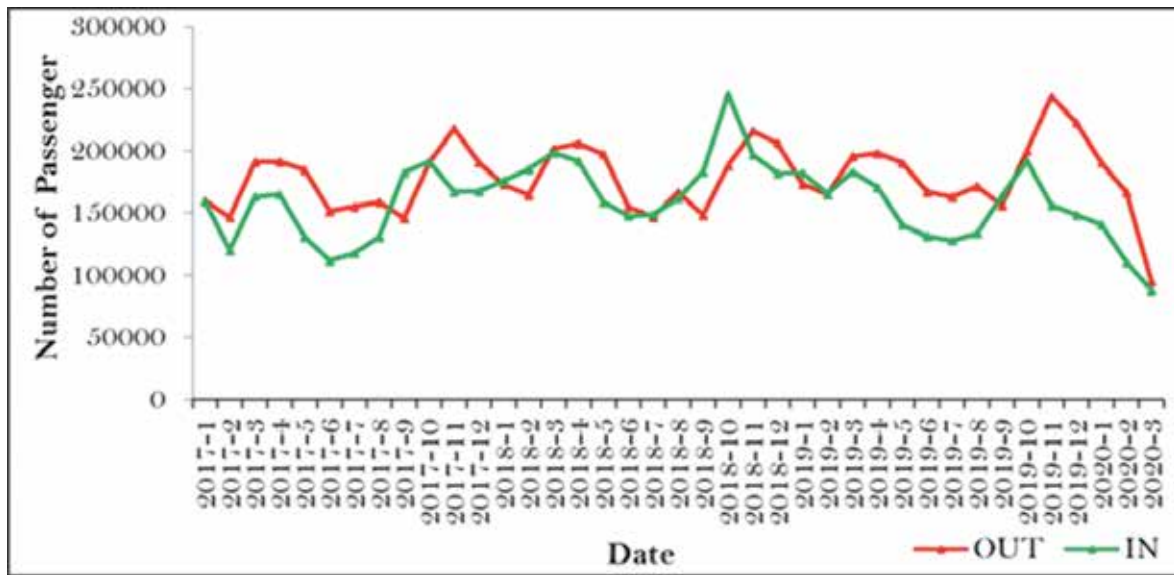


Figure 1: Movement (in and out) of international passengers before lockdown. (Source: CAAN, 2020)

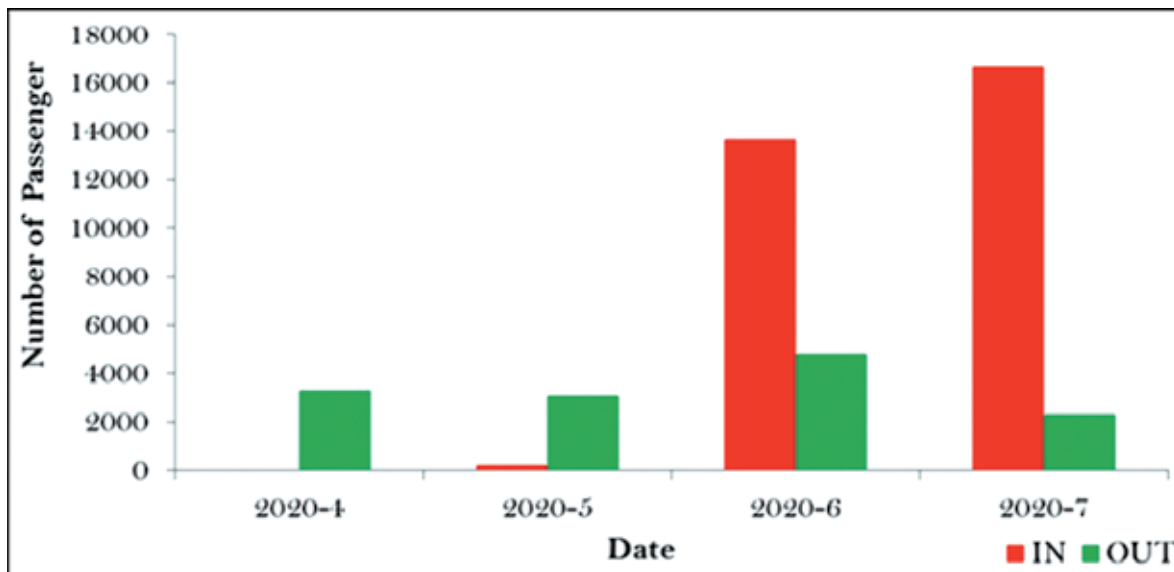


Figure 2: Movement (in and out) of the international passenger during the lockdown.

(Source: CAAN, 2020)



Figure 3: Movement of domestic passengers before lockdown (till March) and during lockdown (Till July). (Source: CAAN, 2020)

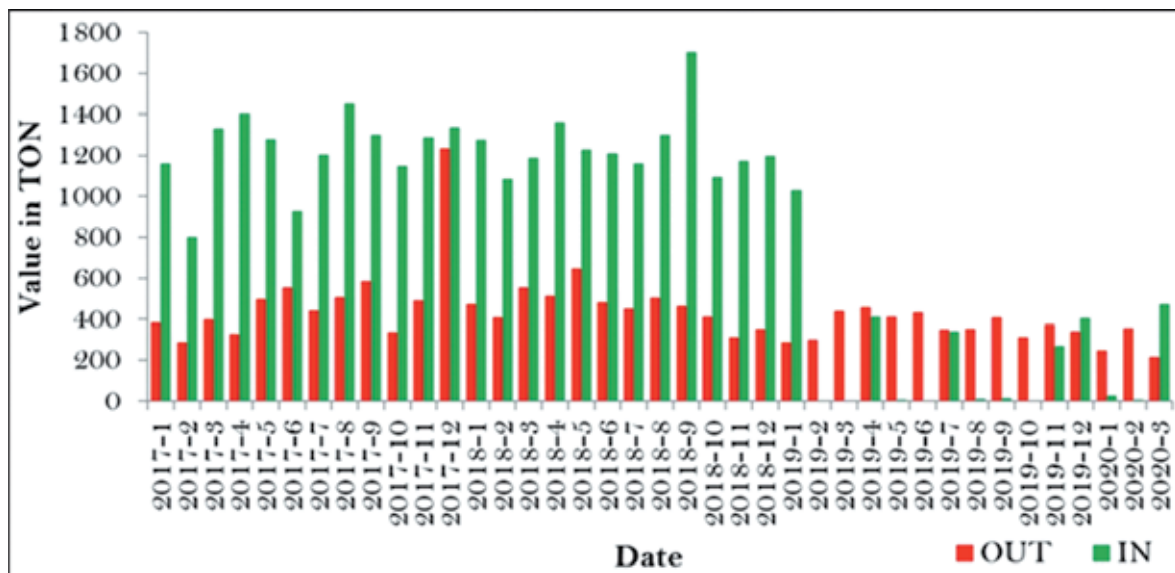


Figure 4: Movement of international cargo from January 2017 to March 2020 (before lockdown) (Source: CAAN, 2020)

4.2.3. International cargo and revenue collected

From January 2017 to September 2018 the outgoing cargo has been increased by 21.94% and incoming cargo has been increased by 46.77%. As per the data available from CAAN no incoming cargo was noticed during February, March, and October of 2019. International cargo movement from April 2019 to March 2020 has been decreased by 52.62% whereas the incoming cargo in the same period has been increased by 15.43% (Fig. 4). The movement of international cargo during the lockdown period i.e. from April 2020 to July 2020 has been fluctuated (Fig. 5). The incoming cargo movement (in and out) from April to June has been increased

whereas in July it has been decreased. The incoming cargo from April to June has been increased by 155.9 tons which again has been decreased by 68.2 tons in July 2020. Whereas the outgoing cargo from April to June has been increased by 317.387 tons and it has been decreased by 143.55 tons in July 2020. The revenue collected from the international cargo in March 2020 has been decreased by 57.47% than in March 2019 and has been decreased by 32.44% in July 2020 than in July 2019.

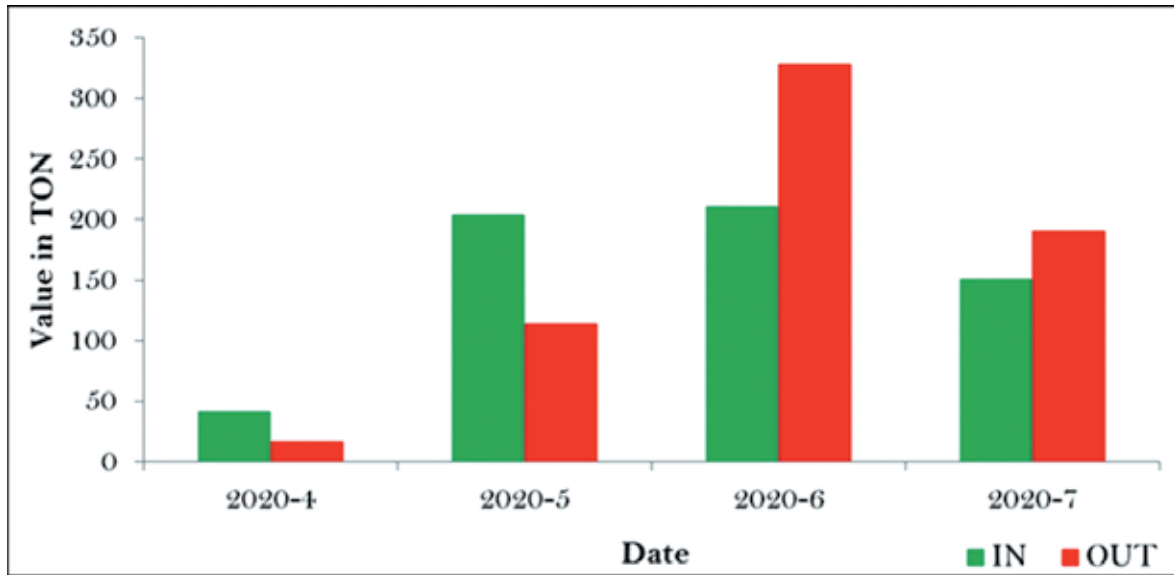


Figure 5: Movement (in and out) of the international cargo during the lockdown. (Source: CAAN, 2020)

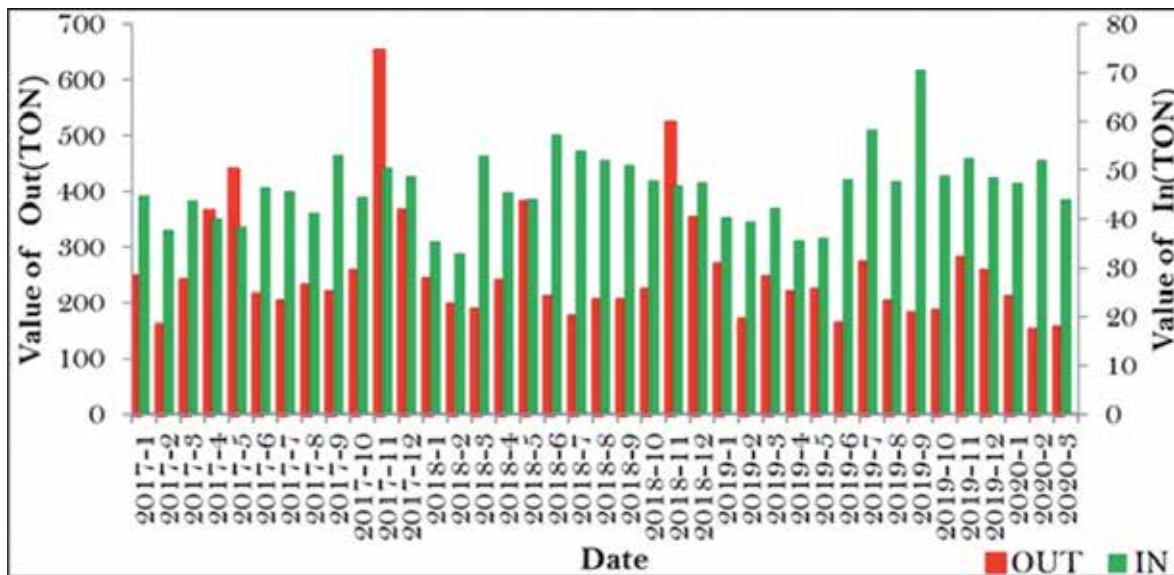


Figure 6: Domestic cargo movement (in and out) before lockdown. (Source: CAAN, 2020)

4.2.4. Domestic cargo and revenue collected

The impact of lockdown has affected domestic cargo movement as it is significantly decreased (Fig. 6). As per the analysis, the movement of outgoing domestic cargo from 2017 to 2018 has been decreased by 2.51%

whereas incoming cargo in the same period has been increased by 9.29%. In January 2019 the outgoing cargo has been increased by 10.82% and incoming cargo has been increased by 14.14%. Whereas, in March 2020 outgoing cargo has been decreased by 36.52% than in March 2019 (Fig. 6). Due to the lockdown, the revenue generated from the movement of domestic cargo in March 2020 has been decreased by 94.95% than in March 2019. During the lockdown (Fig. 7), the incoming cargo has been increased by 15,593 tons which have fallen in July by 68.15 tons. Likewise, the outgoing cargo also has been increased by 317.38 tons and in July it has been decreased by 143.13 tons. Due to the fluctuation in the movement of domestic cargo the revenue generated in July 2020 has been decreased by 24.02% than in July 2019.

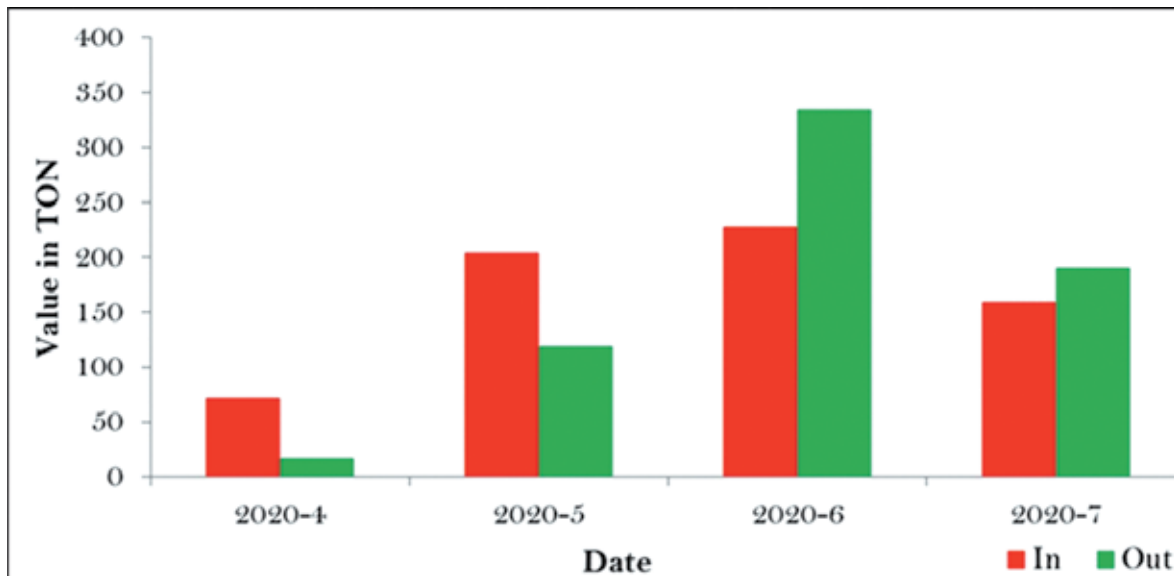


Figure 7: Domestic cargo movement (in and out) during lockdown. (Source: CAAN, 2020)



Figure 8: Trend of revenue (in NPR) paid to IOC to import petrol (in Kilo liters, KL). (Source: Nepal Oil Corporation)

4.3. Petroleum and Oil Industry

4.3.1. Petrol

The effect of lockdown can be easily noticed in the import of petrol and revenue paid to the Indian Oil Corporation (IOC) (Fig. 8). As per the data, 137.42% more petrol was imported in FY 2075/76 than in 2072/73. As the import of petrol has been increased, the revenue paid to IOC has also been increased by 22 billion in Fiscal Year (FY) 2075/76. Whereas, due to Pandemic in FY 2076/77 only 513,984 KL of petrol was imported in Nepal which is a decrease by 9.3288% than in FY 2075/76. The decrease in import of petrol has also decreased the revenue paid to IOC in FY 2076/77 to 6 billion which accounts for the decrease of 20.04%. If the Covid-19 would not have persisted, with the on-going increasing trend in previous years, the import in FY 2076/77 would have been nearly about 13.38% more, and revenue to be paid to IOC would have been 15.35% more than in 2075/76.

4.3.2. Diesel

The import of diesel has been increasing steadily from Fiscal Year 2072/73 to 2075/76 (Fig. 9). But the import and revenue paid to IOC have been reduced significantly after 2075/76 which is due to the effect of lockdown. From the quantitative analysis of data, it is found that in FY 2075/76 NOC imported 1,717,517KL of diesel which is 117.42% more than import in 2072/73. The increase in import of diesel has been increased the revenue paid to IOC by 79 billion in FY 2075/76. Whereas due to Pandemic in FY 2076/77 only 1473427.58 KL of diesel was imported in Nepal which is a decrease by 14.21% than in FY 2075/76. The decrease in import of diesel has also decreased the revenue paid by NOC in FY 2076/77 to 30 billion which accounts for the decrease of 26.94%. If the Covid-19 would not have persisted, the import in 2076/77, with the increasing trend, would be nearly about 11.59 % more, and revenue to be paid would have been increased by 15.18% than in 2075/76.

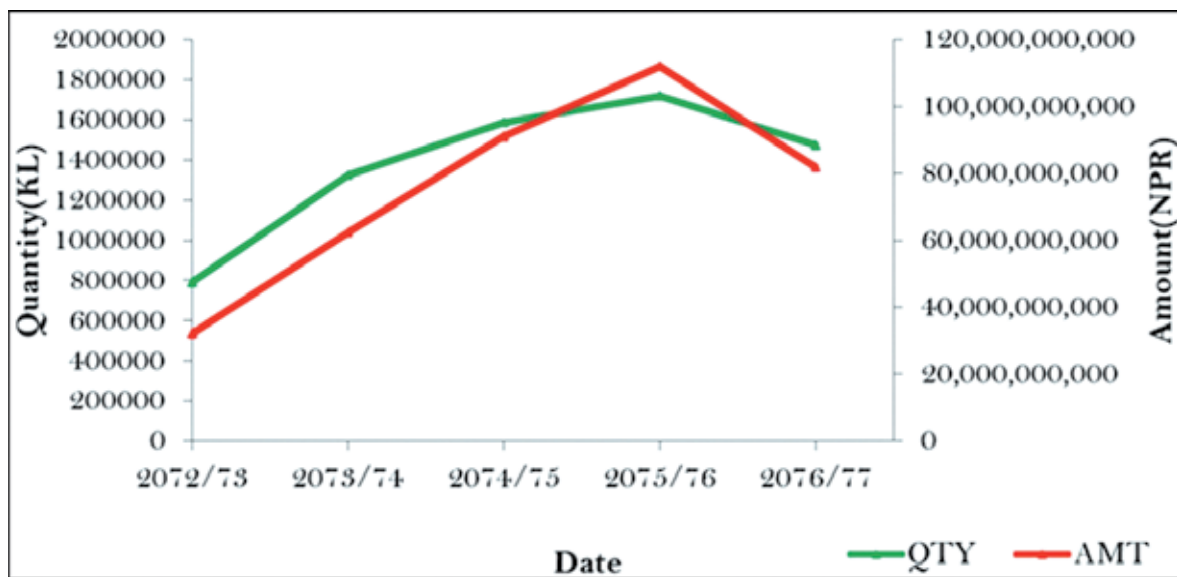


Figure 9: Trend of revenue (in NPR) paid to IOC to import diesel (in Kilo liters, KL). (Source: Nepal Oil Corporation)

4.3.3. Aviation fuel

The import and revenue paid have been increasing from FY 2072/73 to 2075/76 (Fig. 10). But after 2075/76

the import of aviation fuel has been significantly reduced which is because of lockdown. From FY 2072/73 to 2075/76 the import of aviation fuel has been increased by 152.267% and because of which revenue paid to IOC has been increased by 307.645 %. While due to the pandemic in FY 2076/77 a decline of 31.25% has been noticed than in FY 2075/76. The drop in the import of aviation fuel has also decreased the revenues paid to IOC by 4 billion in FY 2076/77, which is a decrease of 36.74%. Based on the increasing rate of the previous year, if the pandemic would not have arrived, import in 2076/77 would have been 10.58 % more than in 2075/76. Moreover, the import in FY 2074/75 and 2075/76 is nearly similar i.e. only 1084 Kl more was imported in 2075/76. Despite the import of only 1084 Kl more in 2075/76, the revenue paid to IOC is 2 billion more in 2075/6. This is because the price of aviation fuel was hiked by IOC during the year 2075/76⁴.



Figure 10 : Trend of revenue (in NPR) paid to IOC to import aviation fuel (in Kilo liters, KL). (Source: Nepal Oil Corporation)

5. Agricultural Sector

The food supply chain is the extensive network that interlinks the agriculture system to consumer tables through manufacturing, packing, storage, and distribution, and this extensive network is mobilized only with the different means of transportation. Travel restriction has disabled the movement of laborers, distributors, and supply of agricultural products to market, and because of this, farmers in Nepal are highly affected. In Nepal, the Dairy industry represents 12.4 % of the agriculture sector and contributes to 3.3% of GDP (CBS, 2018). In the first 8 months of FY 2018/19 Nepal produced 1.475 million metric tons of milk and exported dairy items worth \$1.71 million to India, China, and Japan (DoC, 2019). Due to travel restrictions and failing consumption dairy industry has to bear a loss of 80% accounting for \$30 million and this has impacted the 0.5 million farmers and 10,000 staff involved in the dairy industry (UNDP, 2020). Moreover, In the first nine months of FY 2019/2020, vegetable exports plunged, as Nepal exported vegetables by just \$13.3 thousand which was \$10.05 million in the same period of FY 2018/2019 (NRB, 2020). Not only vegetables and dairy farming but poultry farming which has been supplying 0.1 million metric tons of meat and 1.8 billion eggs (as of 2019) has been disrupted due to difficulties in transport and declination in consumption. During the lockdown private sector have faced a shortage of chickens, eggs and poultry feeder which have resulted to a major decrease in sales by 80% and 50% chickens and eggs respectively (MoALD, 2020).

⁴ Based on information interpreted by Hari Dutta Joshi, Deputy Manager-Finance Department, and NOC.

6. Conclusions

The transportation industry, one of the good contributors to the GDP of Nepal, has been affected due to lockdown. Due to disruption in transportation overall loss of the GDP contributed by transport and its inter-related sector (petroleum products, agriculture, and construction) has been plummeted limiting the growth of the economy to 0.2% only. Impact on the transportation sector directly or indirectly affected the overall development as there have been difficulties in the mobility of manpower and construction materials. In Nepal construction of various projects targeted by the Department of Roads has been affected however with the limited supply of construction material one-third of construction work was continued. Moreover, the aviation industry of Nepal is the hardest hit due to the pandemic. The movement of both international and domestic flights, passengers, and cargo has been drastically declined as a result of which CAAN has to bear a loss of 8.33 billion in revenue collection. Besides this, the import of petroleum products has also been decreased due to imposed lockdown. Undoubtedly the recession in the import of petroleum products will help to compensate the country's trade loss. To overcome the trade loss due to the import of petroleum products, the governing body could shift the focus from petroleum-based vehicles to electric vehicles which will not only help to lessen the dependence of Nepal on India for petroleum products but will also promote hydropower generation. Apart from this, during the data collection, it is found that the storage, update, and management of data in the governing authority is extremely poor. In the post-pandemic period, transport planning, policy management, and operating facilities need to be assessed and re-evaluated.

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Conflict of Interests

Not declared by authors.

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