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## Impacts of the Covid-19 pandemic on traditional oil mining at Wonocolo Village Kedewan Sub-District Bojonegoro Regency East Java

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**Abstract.** Mining in the world consists of modern and traditional mining. Various studies have discussed how field workers were precarious at being exposed to Covid-19 in modern mining. Many studies discuss ways of modern mines overcoming Covid-19, but discussion of research related to the impacts of Covid-19 on traditional mining has not been carried out. This study addressed the effect of the Covid-19 pandemic on traditional oil mining in Wonocolo, Bojonegoro Regency. This work is a descriptive study using observation and in-depth interviews and reviewing secondary data related to conventional mining activities. The results showed that the Covid-19 pandemic has an indirect effect on traditional oil mining activities in Wonocolo. The pandemic caused a decrease in demand, a drop in selling prices, lower production, and temporary closure of wells in Wonocolo traditional mining. In contrast, Covid-19 did not directly affect miners' activities since the miners believed that Covid-19 could not infect them due to the very extreme condition in the mining area that the Coronavirus would not survive.

### 3 Introduction

The Covid-19 pandemic has infected more than 15 million people globally and killed 618,407 people, which means that the virus has infected more than 0.2% of the world population. Until July 21<sup>st</sup> 2020, the development of Covid-19 in Indonesia was still high. On Tuesday, July 21<sup>st</sup> 2020, at 12.00 GMT+7, the mild cases of Covid-19 had increased by 1,655. Thus, the current number was 89,869 people. The total number of patients who have passed away due to the Covid-19 infection was 4,320 people [1]. Indonesia is in the first rank of the highest death cases in Southeast Asia [2].

Covid-19 pandemic affects almost all aspects of life, especially in the economic sector. The impact of the Covid-19 pandemic in the financial element is extraordinary. Those impacts included more than 1.5 million people lost their jobs, 90% were dismissed, and 10% were affected by Termination of Employment (*PHK/Pemutusan Hubungan Kerja*). Meanwhile, imports in the first quarter of 2020 decreased 3.7%, and inflation increased until March 2020, reaching 2.9% [3-4]. In the publication regarding the impact of Covid-19 on the economic sector, the Statistic of Indonesia (*BPS/Badan Pusat*



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Statistik) (2020) revealed that 87,379 respondents showed that the survey results 2.52% of the respondents experienced PHK while 18.34% were laid off [5].

The Covid-19 pandemic also disrupted world oil prices and became unstable [6]. In April, the world oil price was unstable and experienced a significant decrease from the US \$ 18 per barrel (4/19/2020) to twice its value falling to minus in April, which was between -US \$ 35 (4/20/2020) and -the US \$ 6 (4/21/2020). According to the Organization of the Petroleum Exporting Countries (OPEC), this first condition occurred since the recession in 1929.

The instability of the world oil prices during the Covid-19 pandemic will undoubtedly affect the mining sector, especially petroleum mining. Like other economic sectors, the mining sector also got the negative impact of Covid-19. Disruption to the global economy, including the Covid-19 pandemic, will create uncertainty that affects production and productivity, resulting in consequences for workers, suppliers, and the local economy. On the other hand, large-scale mining also significantly contributes to the developing country [7]. The Covid-19 pandemic impact on large-scale modern mining companies has been researched and shown a significant effect. However, the impact of the Covid-19 pandemic on small-scale traditional mining has not been widely studied. Therefore, this study aimed to investigate the effect of the Covid-19 pandemic on traditional oil mining in Wonocolo Village, Kedewan Sub-district, and Bojonegoro Regency.

## 2. Methodology

As a descriptive study, primary data collection was obtained through observation and in-depth interviews with the miners, the village government of Wonocolo, and the PT officers. Bojonegoro Bangun Sarana (BBS). Some secondary data, such as world crude oil price released by OPEC, the amount of production, and local oil price in Wonocolo by PT. Bojonegoro Bangun Sarana (BBS) was also collected as a complement and comparison to the primary data collection.

## 3. Result and discussion

### 3.1. Covid-19 pandemic and Wonocolo traditional oil mining

Wonocolo traditional oil mining is a petroleum mining activity carried out by local communities at Wonocolo Village, Kedewan Sub-district, Bojonegoro Regency. This traditional mining has initially been a Dutch heritage oil mining first drilled in 1894 by Adrian Stoop. It started with 227 oil wells [8,9]. In 1929, the oil field results in Wonocolo fell measurably so that the wells that were not producing were closed. Although they were closed, there was still periodic production until 1938. In 1930, Bataafsche Petroleum Maatschappij (BPM) as the manager had left Wonocolo.

After Indonesia's independence, Wonocolo oil wells did not receive any attention from the government. The abandoned Wonocolo field made the Regent of Bojonegoro gave verbal permission to the Wonocolo community to manage the oil well with the consent of the Village Head [8]. Since then, the Wonocolo oil well has been driven by the local community.

Based on the stakeholders' observation and interview, there was a real effect between the Covid-19 pandemic and the traditional oil mining activities at Wonocolo Village. The government of Wonocolo Village stated that Covid-19 indirectly affected the mining activities, especially the selling price and the discontinuation of oil mining activities. The same thing was said by Bojonegoro Bangun Sarana (BBS) as Regionally-Owned Enterprises (BUMD/Badan Usaha Milik Daerah) that accommodated crude oil sales 493 mining groups that had partnered with BBS. During the pandemic, crude oil's purchase price from the miners has decreased, the same as the amount of production.

For most miners, the Covid-19 pandemic's impact is not directly felt by the miners. Unlike modern large-scale mining workers whose employees were laid off during the government's implementation of Large-Scale Social Restrictions, the traditional mining workers can continue their normal activities during the Covid-19 pandemic. However, they admitted that Covid-19 caused the selling price of crude oil to fall. Oil is the primary source of income for the Wonocolo community. A decrease in the selling

price of crude oil certainly affected the payment of the miners. Therefore, the miners agreed that the Covid-19 pandemic indirectly affected the traditional oil mining in Wonocolo as their source of living.

## 3.2. Effect of the Covid-19 pandemic on traditional oil mining at Wonocolo Village

The Covid-19 pandemic has dramatically affected traditional oil mining in Wonocolo, although it did not directly affect it. However, some of the indirect effects arising from the Covid-19 pandemic include a decrease in demand for crude oil, a reduction in the selling price of crude oil, a decrease in the amount of production, the closure of temporary wells, a decrease in the amount of the miners' income, and a behavior change.

*3.2.1. A decrease in demand for crude oil.* From mid-May to early June 2020, Large-Scale Social Restrictions were imposed in several cities in Indonesia. More extreme restrictions were also implemented in several major cities in the world at different time frames. This condition has an impact on significantly decreasing the consumption of fuel oil. Thus, the number of oil demand in the world has dramatically reduced.

According to Kompas (4/5/20), the reduced world oil demand was due to travel restrictions in many countries. The International Energy Agency (IEA) reported that global crude oil projection in 2020 fell by 1.1 million barrels per day to 99.9 million barrels per day. The Organization of the Petroleum Exporting Countries (OPEC) report showed the same projection too, which was affected by slowing the world economic growth.

The same condition also happened in Wonocolo. Some miners also sold crude oil to mediators to be processed and used as cheap fuel for their regular factories. During the pandemic, social restrictions caused many factories that subscribed to oil to Wonocolo miners stopped operating so that the demand for crude oil to miners also automatically decreased.

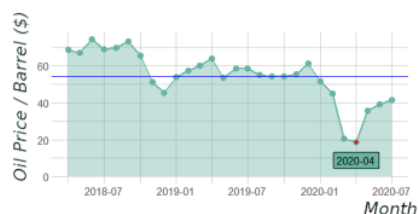
*3.2.2. A decrease in the selling price of crude oil.* A decrease in the selling price of crude oil in Wonocolo was greatly affected by reducing the world crude oil prices. Based on the data of the world crude oil price released by OPEC from January 2019 - July 2020, it can be seen that there was a significant decrease in oil prices in April 2020 in which the world conditions were at the peak of the Covid-19 pandemic. Meanwhile, in Indonesia, the effects of the pandemic are just beginning to be felt.

Based on figure 1, it can be seen that the decrease occurred starting in January 2020, or simultaneously with the initial period of the Covid-19 pandemic in the world. The lowest oil price occurred in April 2020, which was USD 18.8/barrel or the equivalent of IDR 1,833, -/liter. In May 2020, the world crude oil price had crept up to \$ 35.49 USD/barrel or equivalent to IDR 3,268, -/liter and in June 2020, it was \$ 39.27 USD/barrel or the equivalent of IDR 3,593, -/liter.

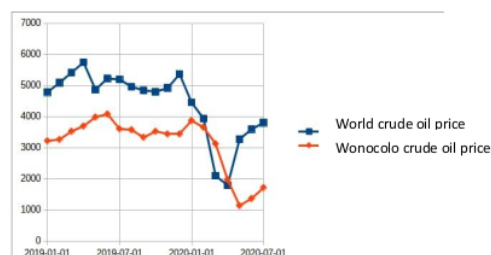
The picture of world crude oil prices above is in contrast to the conditions of crude oil prices in Wonocolo (figure 2). Based on the results of the interview with the miners and the Director of PT. BBS as the oil manager in Wonocolo, a decrease in oil selling prices occurred in April-June 2020. The selling price of crude oil in Wonocolo before the pandemic was around > IDR 3,000/liter, and during the Covid-19 pandemic, it fell until the lowest price reached IDR 1,136/liter in May 2020.

If compared to the world oil price, in April 2020, when the world crude oil price fell to its lowest point, IDR 1,833/liter, the crude oil price in Wonocolo also experienced a decrease to almost the same rate, IDR 1,972, -/liter. However, when the world oil price had crept up to IDR 3,268, -/liter in May 2020 and IDR 3,593, -/liter in June 2020, the oil price in Wonocolo actually dropped to IDR 1,136, -/liter and IDR 1,363, -/liter. It means that the lowest crude oil price prevailing in Wonocolo in May-June did not match the world crude oil price in the same period.





**Figure 1.** World crude oil prices 2018-2020.



**Figure 2.** Comparison of crude oil prices in the world and Wonocolo per barrel for January 2019-July 2020.

**3.2.3. A decrease in the amount of production.** A decrease in oil production in Wonocolo can be determined based on two things: first, the number of fleets that transport the oil produced by the Wonocolo miners to Pertamina and the amount of oil deposited by the miners to PT. BBS. Before the pandemic, the number of fleets deployed to transport oil products from the mining wells in partnership with BBS was 13 fleets with a capacity of 5,000 liters/fleet. At this pandemic, the number drastically decreased to 4 fleets. Second, the average daily amount of oil production deposited by the miners to PT. BBS before the pandemic reached 40,439 liters/day (January 2020) to 140,209 liters/day (February 2020). However, at this pandemic, the number had fallen to 5,820 liters/day in May 2020. The monthly amount of production for January-July 2020 can be seen as listed in table 1.

A decrease in oil production due to the Covid-19 pandemic was caused by reduced world oil prices, which affected the selling price of crude oil in Wonocolo. On the other hand, the production costs and operational costs that had to be incurred by the miners have decreased or have not reduced. As a result, production and operating costs were higher than the obtained results. This condition caused some oil miners to choose to stop using or to close their wells temporarily. Apart from the Covid-19 pandemic consequences, a decrease in crude oil production was also caused by natural and technical factors. Due to biological factors, the reduction in output was due to the depletion of oil reserves in wells, even depleted.

**Table 1.** Oil production managed by PT. Bojonegoro Bangun Sarana to PT. Pertamina EP Asset 4 Field Cepu in 2020.

No	Month	Production (liter)	Average production per day (liter/day)	Increase/decrease in production *
1	January	1,253,613.16	40,439.13	-
2	February	1,402,099.05	140,209.91	99,770.77
3	March	1,442,977.24	46,547.65	-93,662.25
4	April	1,411,456.20	47,049	500.89
5	May	518,793.95	16,735	-30,313
6	June	174,613.09	5,820	-10,915
7	July	215,478.57	10,773.93	4,953

\*Value (-) means a decrease in production

Value (+) means an increase in production.

Technical factors that affected crude oil production in Wonocolo were due to damaged mining equipment. The high cost of repairing wells made the miners often reluctant to make repairs at the

damaged wells. It is costly for the miners considering that the traditional mining group in Wonocolo only had minimal funds and never set aside maintenance costs from oil mining profits.

*3.2.4. The closure of temporary wells.* The Covid-19 pandemic also caused the oil wells to stopped operating and closed temporarily. It caused the production of traditional oil wells in Wonocolo to experience a decrease in general productivity. Based on BBS data in 2019-2020, from 493 conventional wells in Wonocolo, the active wells were only 135 wells. If the total production before the pandemic in January 2020 could reach 1,253,613.16 liters in a month, then it is assumed that the number resulted from 135 active wells, each active well produced around 9,286 liters per month. In June 2020, when the total monthly production fell by 86% to 174,613.09 liters, then it is assumed that each well would produce 9,286 liters. Only 18 active wells had crude oil during the pandemic, while 117 wells or 86.6% of other traditional oil wells in Wonocolo were closed.

*3.2.5. A decrease in the amount of the miners' income.* A decrease in the traditional oil miners' income was due to the drop in the world crude oil price, which caused the selling price of crude oil in Wonocolo to fell by IDR 1,136, -/liter in May 2020. Besides, operating costs were much higher than the results of selling oil. This condition caused the monthly income of the miners to decreased drastically. After the pandemic, the average income of the miners declined by 50-60% per month. The miners whose wells were temporarily closed did not get any payment during the pandemic in May-June 2020. Oil mining is indeed the primary source of income for the community in Wonocolo.

*3.2.6. A change in behavior of the miners.* The Covid-19 pandemic has not almost affected the change of behavior or habit of the traditional miners. Most miners still did not use Personal Protective Equipment, such as masks, headgear, long-sleeved shirts, glasses, or face shields during mining activities. At the mine site, there was no hand sanitizer or a place to wash hands. The miners believed that their territory was still safe because it was still in the white zone, which means that there has not been any case of Covid in the region. The miners also said that the Covid-19 virus would not attack them because the mine site's condition was in the open area with extreme conditions like hot temperatures and the oil's scent.

#### 4. Conclusion

The Covid-19 pandemic did not directly affect the traditional oil mining activities in Wonocolo because the territory of Wonocolo was still safe (white zone). Besides, the miners came from the local people who were not affected by the large scale restriction, the mining system did not need many workers, and there was minimal contact between them. The Covid-19 pandemic indirectly affected the traditional mining in Wonocolo in the case of a decrease in demand and the selling price of crude oil, a reduction in production, and the miners' income.

#### Acknowledgments

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