**Journal of Mechanical, Civil and Industrial Engineering**
ISSN: 2709-0809
DOI: 10.32996/jmcie
Journal Homepage: www.al-kindipublisher.com/index.php/jmcie

JMCIE
AL-KINDI CENTER FOR RESEARCH AND DEVELOPMENT

**| RESEARCH ARTICLE**

# Study and Evaluation of the Extraction of Northern Oil Fields on Income Generation in the Afghan Economy

**Muhammadi Tughyan[1]✉, Saifullah Inanch[2]**
[1]*Associate Professor, Oil and Gas Department, Geology & Mines Engineering Faculty, Jawzjan University, Sheberghan, Afghanistan.*
[2]*Lecturer, Geology and Mines Department, Geology & Mines Engineering Faculty,* Faryab University, Faryab, *Afghanistan.*
**Corresponding Author**: Muhammadi Tughyan, **Email**: m.toghyan64@gmail.com

**| ABSTRACT**
The study and investigation of oil extraction processes play a key role in improving economic productivity and increasing national income. As the main sources of income in many countries, these activities play an important role in economic development, creating employment, and providing financial resources for development projects. Economic analyses show that proper management and advanced technologies in oil and gas extraction can have a significant impact on improving productivity and reducing costs, and as a result, increasing the income generation of the economy. In addition, policies based on sustainable financial principles and proper utilization of resources can prevent price fluctuations and the decline of fossil fuels and ensure economic stability. Afghanistan, as one of the countries rich in natural resources, has significant potential in the oil sector, although major extraction and exploitation has not been carried out in this sector so far. Lack of infrastructure, lack of modern technologies, and internal insecurity are major obstacles to the development of this sector. The release and identification of oil reserves in parts such as the northern and western regions of the country provide great economic opportunities. If these resources are extracted in sustainable and effective ways, they can play an important role in increasing government revenues and improving the livelihoods of the people. If properly and fairly exploited, oil revenues can be an important source of finance for development projects, education, health, and infrastructure. Job creation and poverty reduction as a result of extraction activities are among the direct benefits of these resources. Despite the high potential, Afghanistan faces challenges such as insecurity, weak technology, lack of appropriate investment, and inability to manage resources. These factors prevent full and profitable exploitation and limit economic opportunities. By improving security, developing modern technologies, and attracting international investment, Afghanistan can exploit its oil resources, which can be effective in increasing national income, reducing poverty, and improving public welfare. Attention to proper management, transparency, and compliance with environmental standards are crucial in this path.

**| KEYWORDS**

Extraction, Oil, Job Creation, Economy, Social Welfare, Northern Afghanistan.

**| ARTICLE INFORMATION**

**ACCEPTED:** 10 June 2025 **PUBLISHED:** 30 June 2025 **DOI:** 10.32996/jmcie.2025.6.3.3

## 1.Introduction

As the most important sources of energy and national wealth in many countries of the world, oil and gas play a vital role in economic prosperity and sustainable development. Many countries, especially those with large oil reserves, rely on the development of this industry to increase national income and meet their economic needs. Oil extraction is not only an important source of foreign exchange earnings, but can also facilitate investment flows, create job opportunities, and upgrade economic infrastructure [1]. However, effective and productive exploitation of these resources requires appropriate policies, proper resource management, and attention to environmental issues, as failure to pay attention to these issues may lead to economic and

environmental crises that have negative effects on long-term development [2]. Therefore, a careful and strategic study in the field of oil and gas extraction can play an important role in increasing countries' income from these resources and pave the way for sustainable economic progress.

In recent years, the majority of the world's oil-producing countries have emphasized the importance of oil extraction as a major source of national income. Establishing technological and security infrastructure for the effective exploitation of these resources can play an important role in economic development and public welfare [3,4]. In Afghanistan, especially in the northern regions, there is significant potential in the oil sector that has not yet been fully exploited.

Studying and investigating extraction activities in this region can help to better understand the contribution of these resources to the country's economic income generation and provide suggestions for effective and sustainable exploitation. (Ahmadzai & Noor, 2022) Therefore, examining the role of oil extraction in northern Afghanistan is of great importance in shaping economic development policies and increasing national income.

As key resources in economies dependent on natural resources, oil and gas play a pivotal role in the gross domestic product, trade balance, and foreign exchange reserves of countries. In the long run, the extraction of these resources can lead to economic prosperity, industrial development, and increased national income [4]. However, the role of oil in the economies of oil-rich countries has always been associated with a phenomenon called "oil powerlessness" or "resource syndrome", in which high dependence on oil revenues leads to reduced economic diversification, corruption, and weakness in non-dependent sectors (Sachs & Warner, 1995). From an economic perspective, oil revenues, if properly managed, can provide tangible benefits in terms of infrastructure development, improved welfare, and job creation [3]. However, historical evidence shows that oil price volatility, high dependence on resources, and related corruption pose serious threats to economic sustainability in oil-rich countries [5]. Therefore, sound policies on oil exploitation and export play a key role in increasing income and economic sustainability [6].

In developing countries, the development of foreign oil industries should be accompanied by institutional reforms, transparency, and effective financial management to ensure that oil revenues contribute more to economic development and poverty reduction [7]. For example, sovereign wealth funds, silent fiscal policies, and long-term investment plans are important tools for sustainable oil exploitation [5].

Overall, oil and gas extraction, despite its high revenue-generating potential, requires multi-layered policies, active oversight, and strategic planning to prevent negative consequences such as corruption and economic volatility and to provide long-term benefits to the country.

### 1.1. Importance and Necessity of Research

Given the huge oil potential in the northern regions of Afghanistan, a comprehensive and scientific study of the extraction of these resources and its role in strengthening the national economy is of particular importance. While countries in the region such as Turkmenistan and Iran have effectively exploited oil resources and have generated significant income from them, Afghanistan has not yet been able to fully benefit from these resources [8].

This research analyzes the economic challenges and opportunities in order to understand the different aspects of oil extraction and exploitation in the northern regions and provides appropriate solutions for the sustainable management of these resources. A detailed examination of the resources, the required technologies, and government policies can be an effective guide in macroeconomic and strategic decision-making; including optimal exploitation, reducing corruption, and increasing the share of oil revenues in the national budget. On the other hand, in the unstable political and security conditions of Afghanistan, this research is of particular importance; Because its results can help the natural resources sector to be on the path of sustainable economic development and play an important role in reducing dependence on foreign aid and other limited resources. Given the need to diversify the country's economy and reduce economic instability, accurate and scientific understanding of oil potentials and their intelligent exploitation is essential, which this research aims to respond to.

### 1.2. Research Objectives

The main objective of this study is to examine and analyze the role and importance of oil mining in the northern regions of Afghanistan, especially its impact on income generation and economic development of the country. Specifically, the following sub-objectives have been considered in this research:

1. Identify and assess oil reserves in the northern regions of Afghanistan.
2. Examine current trends and prospects of oil extraction activities in these regions.
3. Analyze the impact of oil extraction on government revenues and the country's economic development.
4. Examine the challenges and opportunities for effective and sustainable exploitation of oil resources in Afghanistan.
5. Propose policy and natural resource management solutions for better and fairer exploitation of the oil industry.
6. Determine the role of these resources in reducing poverty, creating employment, and improving the level of general welfare in the northern regions and the entire country.

### 1.3. Research hypotheses

1. Oil extraction in the northern regions of Afghanistan plays a significant role in increasing national income and economic development of the country.
2. Increased oil extraction activities lead to the creation of job opportunities in the region and the reduction of unemployment.
3. The existence of oil resources in the northern regions, if managed properly, can play an important role in reducing poverty and improving the level of general welfare.
4. Security, technological, and managerial obstacles are among the main challenges in the effective exploitation of oil resources in Afghanistan.
5. The sustainable development and exploitation of oil resources requires transparent and effective government policies and effective communication with the private sector.

## 2. Research Method

The research method in this study was conducted with three perspectives : purpose, method, and nature of data. From the perspective of the development and promotion purpose, from the perspective of the qualitative method, and from the perspective of the nature of the data, it is descriptive-analytical. Data and information are collected through a library method with an analysis of documents, reports, and previous domestic and foreign studies about Afghanistan's oil resources and its development trends. One of the limitations of this study is insecurity and restrictions on access to some resources and areas and reduced responsiveness due to security or political reasons.

### 2.1. Introduction to the research area

Sar-e-Pul province is one of the 34 provinces of Afghanistan, centered on the city of Sar-e-Pul. This province is located in northern Afghanistan and, according to statistics, has a population of 621,002, making it the eighteenth most populous province in Afghanistan. Sar-e-Pul covers an area of 16,360 square kilometers and is neighboring with Faryab, Jawzjan, and Balkh provinces to the west and north, Ghor and Bamyan to the south, and Samangan to the east. This province is located on the northern slopes of the Turkestan Belt and is located between 35 degrees and 30 minutes east to 36 degrees and 13 minutes north and 66 degrees and 30 minutes south and 65 degrees and 29 minutes east, and its height above sea level in flat areas ranges from 64 meters to 1750 meters in mountainous areas. Also, 75% of the land of Sar-e-Pul province is mountainous or semi-mountainous, and only 14% of it is flat land, and the remaining 11% is forested, semi-flat, etc.

The height of Sar-e-Pul province above sea level ranges from 640 meters in flat areas to 1750 meters in mountainous areas. The northern plates of the country, which have an area of more than one hundred thousand square kilometers, have sedimentary rocks, which are favorable for the accumulation of oil. The buildings around and around Sar-e-Pul province are also considered rich in oil. In the case of the oil fields of northern Afghanistan in the late 18th century, geologists such as Chris Bach, Hayden, and Furn studied the subject in their time and, as a result, they assumed the existence of oil in Sar-e-Pul province on Mount Angot. On this basis, between 1938 and 1940, European geologists Ives, Kalp, Kirch, and Sheng presented theories about the geological structure of the plates of northern Afghanistan and the location of oil and gas-producing lands. In late 1956, i.e. early 1953, it ended at a depth of 817 meters with the discovery of signs of oil in the Apet, Elbe, Cinoman and Torun sediments, which were the lower and partly upper Cretaceous strata. Similarly, well number (2) of the Angot stratigraphy to the west of the first point, at a distance of 2.5 kilometers, drilling in the Horus constellation began in 1956 and ended in 1958, i.e. early 1958, at a depth of 1121 meters with the discovery of the lower Cretaceous and the discovery of signs of oil that did not have an industrial flow. Meanwhile, drilling and exploration continued in the areas under observation, and finally, in Sar-e-Pul province, in well number (8) of Angot, at a depth of 1107 to 1147 meters, in 1967, from the lower Cretaceous strata known as the Getreef (G.h) stratum, oil gushed out at a rate of seventy tons per day and night. Therefore, exploration wells number (9) to fifteen were drilled, and oil with an industrial rate was revealed from wells (9, 12, and 13) of Angot, the characteristics of which are as follows:

The Angot structure, which is located five kilometers east of Sar-e-Pul city and its altitude is 1110 meters above sea level, was discovered in horizon 14, the Hatareef stratum, in 1967. The size of the Ongut reservoir is 3.3×1.8 with an amplitude of 90.0 meters and its depth is from 1035 to 1092 meters and the oil density is 0.914 grams per cubic centimeter and has volatile substances, namely combustible oils in oil, 27 percent, sulfur content 2.86 percent, paraffin 3.4 percent, semolina and asphaltene content 17.9 percent and is relatively dense and its condensate gas content is from 5.6 to 12.0 grams per cubic meter. The pressure of the layer is 13.9 MPa and the temperature of the aforementioned layer is 53 degrees Celsius.

The actual area of the mentioned reservoir is 1794 thousand square meters with an actual thickness of 16.5 meters and an oil yield coefficient of 0.35, and the depth of the wells was initially from 28 to 258 cubic meters per day and night. The initial balance reserve calculated in 1991 is (3400) thousand tons and the extractable is 1125 thousand tons, that is, 1.125 million tons. By investigating geological affairs in 1974, a second mine called "Aq Darya" was discovered near the village of Balghali, located ten kilometers southeast of the city of Sar-e-Pul, which is 821 meters above sea level. In that area, industrial oil was obtained from the eleventh geological layer, namely Elb, and the fourteenth layer, namely Hatarif, and wells (1) to (6) were zero and ended. Oil has been produced in wells (1) and (2) of Aq Darya, and oil has been extracted from well (2) due to the government's needs at the time. The size of the aforementioned reservoir in the Elb layer is 3.9 by 2.3 km with an amplitude of 170 meters, and in the Hatariv

layer it is 2.3 by 2 km with an amplitude of 120 meters. Their depths range from 850 to 957 meters in the Elb layer and from 1186 to 1365 meters in the Hatariv layer. The density of the Elb layer oil is 0.82 and from 0.92 grams per cubic centimeter, the content of combustible materials in the Elb layer is 57 percent and in the Hatariv layer is 32 percent, and the sulfur content in the Elb layer is 0.71 percent and in the Hatariv layer is 2.88 percent. The paraffin content of the Elb layer is 9.5 percent and that of the Hatarif layer is 10.2 percent, the semolina and saflite are 4 and 2 percent in the Elb layer, and 12.3 percent to 21.6 percent in the Hatarif layer, and the concentration of the Nesbat oil is thinner than that of the Ongut oil, and the temperature of the layer is the same as that of the Ongut reservoir.

The actual oil-bearing area of the Elb layer is 7590 thousand square meters and of the Hatariv layer is 1930 thousand square meters. The actual oil-bearing thickness of the Elb layer is 5.7 meters and of the Hatariv layer is 5.6 meters. The oil yield coefficient of the Elb layer is 90.25 and of the Hatariv layer is 0.30. The pressure of the Elb layer is 14.3 and of the Hatariv layer is 17.9 MPa. The calculated reserves in 1991 are 1848 thousand tons in the Elb layer and 1024 thousand tons in the Hatariv layer, which is a total of 2827 thousand tons, and the extractable reserves of the Elb layer are 462 thousand tons and of the Hatariv layer are 307 thousand tons, which is a total of 769 thousand tons. According to preliminary calculations, the Elb layer is 1885 thousand tons and the extractable reserves of the Aq Darya area are 471 thousand tons, which means that the total extractable oil in the Aq Darya area is 1240 thousand tons, that is, 1.24 million tons [8].

In 1976, a third oil-bearing field called Kashqari was discovered, located twelve kilometers south and southeast of Sar-e-Pul city. The Kashqari oil-bearing field, which is 1,159 meters above sea level and measures about 7.5 by 1.5 kilometers, is divided into the Elb, Apt, and Hatariv strata, which are four oil-bearing strata in total and generally belong to the Cretaceous strata. A total of ten exploration and exploratory wells have been drilled in the Kashqari area, including wells (1, 2, 3, 4, 8, 9 and 10) that are oil-bearing. The general properties of the oil-bearing layers are as follows: In the Elb layer: The size of the reservoir is 7.5 by 1.5 kilometers and its amplitude is 200 meters, with the aforementioned horizon from 958 to 1182 meters, oil density of 0.851 grams per cubic centimeter, and the content of volatile materials is from 36 to 60 percent, sulfur content of 1.3 percent, paraffin 2.53 percent, asphaltene 17.97 percent, and kinematic density of 11.1 centipoise, and condensate gas of 13.53 grams per cubic meter, layer pressure of 12.1 megapascals, and layer temperature of 50 degrees Celsius. The main oil-saturated area is 7690 thousand square meters, its height is 3.3 meters, the permeability coefficient is 0.20, and the oil-dehydration coefficient is 0.26, the well discharge is from 7.2 to 48 cubic meters during the day and night. The oil in this layer is 2485 thousand cubic meters and the extractable is 620 thousand cubic meters [11].

Upper Apt layer: The size of the reservoir is 6 by 1 km with an amplitude of 130 m and the position of the horizon is from 1047 to 1241 m, the oil density is 1.852 grams per cubic centimeter, the content of volatile substances is 50.0 percent, sulfur is 1.20 percent, paraffin is 5.2 percent, asphaltene is 7.2 percent and the kinematic density is 52.9 centipoise, i.e. milligrams per second per square centimeter, the condensate gas property is 10.91 grams per cubic meter, the layer pressure is 12.6 MPa and the layer temperature is 52 degrees Celsius. The actual oil saturated area is 4460 thousand square meters and its height is 11.1 meters, the permeability coefficient is 0.74 and the oil yield coefficient is 0.30 and the well flow is from 22 to 95 cubic meters per day and night, the amount of oil in the aforementioned reservoir is 7034 thousand tons and 2107.0 thousand tons can be extracted.

Final Apt layer: The size of the reservoir is 4.5 by 0.5 kilometers with an amplitude of (120) meters and the horizontal position is from 1083 to 1190 meters and the oil density is 0.82 grams per cubic centimeter and the content of volatile substances is from 35 to 75 percent, sulfur is 0.64 percent, paraffin is 7.39 percent, and stellite is 14.21 percent. It has a condensate gas of 8.7 grams per cubic meter, a layer pressure of 16.4 MPa and a layer temperature of 61 degrees Celsius. The main oil-saturated area is 1670 thousand square meters with a height of 7.4 meters, the permeability coefficient is 0.19 and the oil coefficient is 0.69 and its oil yield coefficient is 0.3 and the well flow is from 5 to 25 cubic meters per day and night and the amount of oil in the aforementioned layer is 1290 thousand tons and the extractable is 387 thousand tons. Hatariv layer (late Cretaceous): The size of the reservoir is 6.6 by 1.3 km with an amplitude of 110.0 meters, the depth of the horizon is from 1382 to 1628 meters, the oil density is 0.90 grams per cubic centimeter and the average content of volatile substances is 30.5 percent, sulfur is 2.3 percent, paraffin is 4.2 percent, asphaltene is 18.04 percent and the kinetic concentration is 42.9 centipoise. The condensate gas content in this layer is 8.7 grams per cubic meter of oil, the layer pressure is 16.4 MPa and the layer temperature is 61 degrees Celsius. The main oil-saturated area is 4,650,000 square meters with a height of 16.5 meters, the permeability coefficient is 0.21 and the oil coefficient is 0.54 and its oil yield coefficient is 0.37, the well discharge is from 5 to 197 cubic meters per day and night, and the oil content in the layer is 8,806,000 tons and the extraction capacity is 3,253,000 tons. In general, the oil content in all four layers in Kashqari is 19,650,000 tons and the extractable is 6,367,000 tons, meaning that out of 19,650 millions tons of oil, 6,367 millions tons can be extracted.

As a result of the analytical and exploration work, the fourth oil accumulation area was discovered in 1977 in Bazarkami, which is located 20 kilometers west of Sar-e-Pul. The size of the reservoir in the Late Cretaceous layer, namely Gatarif, is 18 by 1.4 kilometers with an amplitude of 30 meters. The location of the mentioned horizon is from 1668 to 1680 meters, and the oil density is 0.856 grams per cubic centimeter, the average content of volatile substances is 50.6, the sulfur content is 1.8 percent, the paraffin content is 2.17 percent, asphaltenes are 6.2 percent, and the kinetic concentration is 16.2 centipoise, and the content of condensate gas is from 2 to 10 grams per cubic meter. The pressure of the layer is 23.3 megapascals and the temperature of the layer is 82 degrees Celsius. The main oil-saturated area is 2400 thousand square meters with a height of 5.6 meters, the permeability

coefficient is 0.20, the oil coefficient is 0.59, and the oil yield coefficient is 0.37. The wells are from 0.9 to 26 cubic meters day and night, and the oil reserves in this same layer are 750 thousand tons and the extractable amount is 277 thousand tons. As a result of the exploratory and exploration activities of domestic and foreign geologists and specialists, in 1978, another area called Zamardsay was discovered, which has a significant accumulation of oil in the lower Cretaceous layer, namely Gatarif, and is located 55 kilometers northwest of Sar-e-Pul. Zumrudsay is rich in oil in the 14th geological layer of the northern side, namely Gatarif, with a reservoir size of 9.5 x 2.7 km with an amplitude of 84 m and a depth of the horizon between 1650 and 1770 m. The oil density is 0.887 g/cm3 and the average mineral content of the layer is 31.0%, sulfur is 2.1% on average, paraffin is 4.4%, asphaltene is 8.2% and the kinematic concentration is 43 centipoise. The gas condensate content is between 12 and 20 g/cm3 of oil and the layer pressure is 21.5 MPa and the layer temperature is 83°C. Its calculation parameters are as follows: the main oil-saturated area is 10,063 square meters, the oil-saturated thickness is 8.6 meters, the permeability coefficient is 0.22, the oil coefficient is 0.64, and the oil yield coefficient is 0.25. The wells' discharge is from 2.6 to 144 cubic meters during the day and night. The oil content in this layer is 10,688 thousand cubic meters and its extractable content is 2,672 thousand cubic meters. In general, in all five mentioned areas, the extractable oil content is 11.21 million tons of oil, according to the calculations [8, 11].

## 3. Research findings

The present study concluded that oil resources in northern Afghanistan have a good potential to increase the country's national income. Also, the extraction of these resources can be an important source of foreign exchange and domestic revenue for the government and play an important role in economic development. On the other hand, activities related to oil extraction can provide many job opportunities, which are effective in reducing unemployment. The development of this industry can strengthen economic stability and national security, of course, if properly managed and corruption is prevented. Problems such as the lack of necessary infrastructure, corruption, insecurity, and the lack of modern technologies can limit the effective exploitation of these resources. It was found that for optimal exploitation, foreign investments and international cooperation are required. Oil extraction can be an incentive for the development of infrastructure such as roads, electricity, and transmission. Overall, this project can significantly strengthen income generation and economic development in Afghanistan, if implemented with the right policy and environmental considerations.

Studying and investigating the extraction of oil fields in northern Afghanistan can play an important role in strengthening the country's financial and economic development. This region has a high potential for developing the oil sector due to its rich natural oil resources. Oil extraction is of great importance. Oil resources in northern Afghanistan, especially Sar-e-Pul Province, if exploited, can generate significant income for Afghanistan [8]. Income from oil sales can help develop infrastructure, create job opportunities, and reduce dependence on foreign aid [9]. Research shows that parts of northern Afghanistan, including oil fields, have been identified, but their full development is still in the research and testing stage (US Geological Survey, 2020). So far, several oil and gas contracts have been signed between the Afghan government and domestic and foreign companies, but activities are limited and have not reached the full exploitation stage [11]. Also, insecurity in the region, political problems, and instability are among the biggest obstacles to extraction operations [8]. On the other hand, the lack of appropriate infrastructure for extraction, transportation, and refining of oil and gas processes [11]. It should be noted that the lack of precise and transparent laws for the management and supervision of natural resources is one of the extraction challenges (Ministry of Mines Afghanistan, 2022). Among the important and outstanding benefits ; the development of the oil sector can create sustainable and long-term financial resources for the government [9]. Also, proper exploitation can lead to the creation of thousands of direct and indirect job opportunities [10]. Finally, proximity to regional trade routes, markets of neighboring countries, and opportunities for oil exports increase.

Now, the process of extracting oil from nine wells, including six wells in Kashqari and three wells in Angut Sar-e-Pul, has begun by a Chinese contractor, and an average of about 350 tons per day is being extracted from these nine wells. Also, 15 more oil wells are scheduled to be activated from the Amu oil field, which has an area of 4,000 square meters. Sar-e-Pul residents say that they expect that by extracting oil from Sar-e-Pul, attention will be paid to implementing development projects and providing work opportunities for the residents of this province.

If the revenues obtained from oil are managed properly, the urban infrastructure of Sar-e-Pul province and its neighboring provinces will be completed in a standard manner and social welfare will be built.

On the other hand, the extraction of these huge oil mines will provide employment opportunities at various levels, which will ensure the continuation of worthy service of the educated youth and prevent the escape of the cadres.

In the Kashqari region, with the existence of oil wells, with the opening of another new oil well in the Kashqari region of Sar-e-Pul province, the rate of oil extraction has reached more than five thousand barrels per day. With the opening of well number 23 in the Kashqari oil region, an important stage has begun. Af-China Company plans to soon start drilling more wells in Kashqari, Aqdariya and Zumrudsay, and with the drilling of this well, our oil extraction level will be significantly strengthened.

Oil extraction in the Amu Darya basin, which is currently mainly carried out in the Kashqari region of Sar-e-Pul province, has set the wheels of domestic oil refining companies in motion.

Investment in the oil refining sector in Afghanistan began about a decade ago. Previously, in 2012, a 25-year contract for the extraction of oil from the Amu Darya basin was signed with the National Oil Company of China, but due to "insecurity", the extraction work was not carried out.

Specifically, this contract was signed in 2021 to attract investment, especially from China, in the extraction of oil and mines in Afghanistan. It is speculated that in the near future, the rate of oil extraction from the wells of this upper basin will reach 1,000 tons per day.

The increase in oil extraction from the Kashqari oilfield Will positively change the economy of the country, especially Sar-e-Pul, and will create job opportunities. Specifically, it will focus and develop the country's oil extraction in order to achieve self-sufficiency.

Efforts should be made to achieve these goals through energy production for industries, especially oil-related industries. On the other hand, efforts should be made to make oil extraction and refining knowledge available in the country and to independently use the country's large mining assets and capital in the dimensions of development and expansion, and we will be among the countries of social and economic prosperity.

The extraction of the Amu Darya oil field has been entrusted to a Chinese company, and it is said that Afghanistan will earn $500 million annually from the sale of oil from these wells.

With the drilling and activation of eight new wells, the number of active wells in the country has reached 17, and the daily extraction level will increase to 800 cubic meters.

The Amu Darya oil field, with an area of 4,500 km, is located in the three northern provinces of Jawzjan, Sar-e-Pul, and Faryab. According to the latest oil discoveries in Afghanistan, the country has about 1.8 billion barrels of crude oil, about 3 trillion cubic meters of natural gas, and 562 millions barrels of liquefied gas as potential.

**Figure1**. View of the Kashqari oil extraction system in Sar-e-Pul province.

## 4. Conclusion

According to this study, the extraction of oil fields in northern Afghanistan is one of the valuable resources that provides huge economic opportunities, infrastructure development, and increased national income for the country. Effective and sustainable exploitation of these resources requires professional management, appropriate investments, strengthening infrastructure, and serious attention to security and environmental issues. If these things are realized, oil extraction can play a key role in strengthening the national economy, reducing unemployment, and stabilizing Afghanistan's economic security; but at the same time, possible environmental and social damages must be carefully managed to ensure sustainable and fair exploitation of these resources. Overall, despite the high potential in the oil sector, the development of these resources requires political stability, domestic and foreign investments, and effective cooperation between the government, international organizations, and private companies. If these factors are realized, a positive future awaits the development of Afghanistan Natural ressources.

**Funding**: Please add: “This research received no external funding” or “This research was funded by NAME OF FUNDER, grant number XXX” and “The APC was funded by XXX”.

**Conflicts of Interest**: Declare conflicts of interest or state “The authors declare no conflict of interest.”

**ORCID iD: 0009-0002-3700-0496**



## References

[1] Al-Kuwari, O. (2024). The Future of Liquified Natural Gas in a Decarbonising World. Routledge.
[2] Auty, R. M. (Ed.). (2001). Resource abundance and economic development. Oxford university press.
[3] Bashir, Z., Rashi, B., & Nisa, M. Organic Fertilizers: Types and Benefits of Organic Fertilizers. In Organic Farming (pp. 80-118). CRC Press.
[4] Bharti, S. S. (2022). Confronting Afghanistan's Security and Development Challenges: A Contribution of the European Union. 18(4), 151-176.
[5] Chaudhuri, S., & Roy, M. (2024). A lost frontier or a new gateway to global climate action? The Afghan leadership and the revival of Afghanistan's mineral sector. India Quarterly, 80(1), 26-54.
[6] Chang, M. E. N. G., Yolchi, J., & Ghafoori, N. (2024). Afghanistan: The Economic Impact of Armed Conflict. Conflict Studies Quarterly, (48).
[7] Guo, Y., Yang, Y., Bradshaw, M., Wang, C., & Blondeel, M. (2023). Globalization and decarbonization: Changing strategies of global oil and gas companies. Wiley Interdisciplinary Reviews: Climate Change, 14(6), e849.
[8] Mahdi, Z., Abe, K., Seddiqi, K. N., Chiyonobu, S., & Fujii, H. (2023). Increasing Recoverable Oil in Northern Afghanistan Kashkari Oil Field by Low-Salinity Water Flooding. Energies, 16(1), 534.
[9] Mehrad, A. T., Zvolinski, V. P., Kapralova, D. O., & Niazmand, M. A. (2020, December). Assessment of oil and gas resources of northern Afghanistan and their impact on energy security in the country. In IOP Conference Series: Materials Science and Engineering (Vol. 976, No. 1, p. 012038). IOP Publishing.
[10] Sachs, J. D., & Warner, A. M. (2001). The curse of natural resources. European economic review, 45(4-6), 827-838.
[11] Safi, L. (2024). Review of Afghanistan's development pattern from 2001 to 2021: a relative lack of sustainability, inclusiveness, and prosperity. Journal of Social and Economic Development, 26(1), 333-352.