



OPEN ACCESS

EDITED BY

Swasti Vardhan Mishra,
Rabindra Bharati University, India

REVIEWED BY

Mirawati Yanita,
University of Jambi, Indonesia
Binay Krishna Pal,
Sitalkuchi College, India

*CORRESPONDENCE

Nina Yulsaini
✉ ninayulsaini@soc.uir.ac.id

RECEIVED 20 February 2025

ACCEPTED 07 July 2025

PUBLISHED 24 July 2025

CITATION

Yulsaini N, Maulidiah S and Harakan A (2025)
Palm oil fluctuations and urban vulnerability in
pursuit of sustainable industrial cities of the
Global South. *Front. Sustain. Cities* 7:1580197.
doi: 10.3389/frsc.2025.1580197

COPYRIGHT

© 2025 Yulsaini, Maulidiah and Harakan. This
is an open-access article distributed under the
terms of the [Creative Commons Attribution
License \(CC BY\)](https://creativecommons.org/licenses/by/4.0/). The use, distribution or
reproduction in other forums is permitted,
provided the original author(s) and the
copyright owner(s) are credited and that the
original publication in this journal is cited, in
accordance with accepted academic practice.
No use, distribution or reproduction is
permitted which does not comply with these
terms.

Palm oil fluctuations and urban vulnerability in pursuit of sustainable industrial cities of the Global South

Nina Yulsaini^{1*}, Sri Maulidiah¹ and Ahmad Harakan²

¹Department of Government Studies, Faculty of Social and Political Sciences, Universitas Islam Riau, Pekanbaru, Indonesia, ²Doctoral School of International Relations and Political Science, Corvinus University of Budapest, Budapest, Hungary

Introduction: This study examines how fluctuations in the palm oil industry affect the social and economic vulnerability of urban communities in the Global South, with a particular focus on Dumai City, Indonesia—a palm oil industrial hub striving to achieve sustainable development. Dumai is a major hub for palm oil downstreaming, which produces various commodities such as cosmetics, edible oil, margarine, butter, soap, shampoo, biodiesel, and detergent. As Riau Province ranks first nationally in oil palm plantation area, it serves as a critical region for analyzing these fluctuations and their socio-economic consequences.

Methods: This research employs an exploratory qualitative approach to investigate the impact of investment fluctuations in the palm oil industry. Data analysis is conducted using Nvivo 12 Plus software, enabling systematic categorization and interpretation of qualitative data.

Results: The findings indicate that fluctuations in investment realization—both Foreign Direct Investment (FDI) and Domestic Investment (DI)—significantly impact economic growth, Gross Regional Domestic Product (GRDP), and employment opportunities in Dumai. The investment climate remains unstable, affecting the city's ability to sustain long-term economic resilience.

Discussion and conclusion: The study concludes that industrial investment in Dumai has not yet reached its full potential, leading to persistent economic uncertainty and employment challenges. To ensure socio-economic stability and long-term industrial sustainability, government policies and strategic interventions are essential to enhance investment in the palm oil industry. This study contributes to the Dumai City Government by providing insights into policy development for sustainable industrial growth and economic resilience. It underscores Dumai's role as one of the leading palm oil industrial cities in the Global South, highlighting the need for improved governance to navigate market fluctuations effectively.

KEYWORDS

palm oil, fluctuation, impact, socio-economic, community, sustainable cities

1 Introduction

Palm oil remains a profitable and high-value commodity for communities in the Global South, particularly in Dumai City, Riau, Indonesia. Changes in the land area of each commodity have also affected the amount of production of these commodities. Farmers currently sell various plantation goods in exchange for palm oil in the form of fresh fruit

bunches (FFB), as the palm oil industry in Dumai City still produces palm oil primarily from raw materials. Several Palm Oil commodities provide fresh investing opportunities thanks to commodity realities (Bahruddin Macdonald et al., 2024; Lugo-Arias et al., 2024; Pacheco et al., 2020; Petri et al., 2023). Several derivatives or downstream of Palm Oil is one of the biggest investment opportunities in Dumai City, currently CPO as the main production of PKS is over supply to the world market, so the price of CPO in Indonesia tends to fluctuate and is highly dependent on the economic conditions of importers (Arsyad et al., 2020; Go and Lau, 2024; Jeong et al., 2023; Syahza and Asmit, 2020).

The palm oil industry provides employment to millions of people and plays a significant role in the nation's Gross Domestic Product (GDP), making it one of the most important economic sectors in Indonesia. With much land allocated specifically for oil palm, Riau Province is considered the center of Indonesia's oil palm plantations. Amidst Riau's dominance in the industry, Dumai has emerged as an important and indispensable center for the production and processing of palm oil derivative products.

Dumai City is very important for the palm oil industry due to its strategic location on the east coast of Sumatra. Dumai is the export center for crude palm oil (CPO) and its derivatives to the international market thanks to its important deep-sea port. The area has many oil palm plantations, as well as major investments in the construction of palm oil processing plants (PKS), refineries, and oleochemical plants. These facilities have transformed Dumai from a mere agricultural area into an integrated industrial center that can process fresh fruit bunches (FFB) into various value-added products, such as biofuel, margarine, cooking oil, and soap.

The palm oil industry has a significant economic impact on Dumai City. Starting from palm oil farmers, factory workers, to the logistics and transportation sectors, thousands of direct and indirect jobs have been created. With local taxes, levies, and multiplier effects generated by large economic activities, this industry also contributes greatly to Dumai City's Original Regional Income. The development of Dumai's downstream palm oil industry has also increased the diversification of the local economy, reduced dependence on crude CPO exports, and increased the added value of products before they are exported.

However, despite Dumai's rapid economic development, the palm oil industry also faces many problems. To address sustainability issues such as deforestation, waste management, and land conflicts, a broad approach is needed. In addition, fluctuations in commodity prices around the world can impact a country's economic stability. As a result, to create a more inclusive and sustainable development strategy in the future, it is imperative to conduct a comprehensive study of the dynamics of the palm oil industry in Dumai City, covering economic, social, and environmental aspects.

This condition also provides opportunities for investors and business people both from within and outside the country to continue the CPO business to its derivative products such as cosmetics, edible oil, margarine, jam, soap, shampoo, biodiesel, detergent and others (Baka et al., 2024; Deser et al., 2020; Hoang et al., 2021; Snashall and Poulos, 2023). Dumai City is home to a sizable 38,665,500 hectare palm oil plantation. Currently, palm oil farmers' FFB output is typically sold straight to palm oil mills

(PKS) via collectors. However, the utilization for farmers or the community is not balanced with the investment in the plantation. As for Palm Oil products amounting to 82,554.47 tons, therefore the investment opportunities in the Palm Oil industry are very large for Foreign Investment and Domestic Investment. This condition also provides an opportunity for investors and business people to continue the derivatives or downstream of oil palm such as CPO such as cosmetics, edible oil, margarine, butter, soap, shampoo, biodiesel, detergent (Thongchul et al., 2022). Oil palm is a prime commodity for plantation crops in this area. Based on data from the Indonesian Ministry of Agriculture, in 2023, Riau Province was recorded to have an oil palm plantation area of 2.87 million hectares or 20.68 per cent of the total oil palm plantation area spread across 26 provinces in Indonesia. Riau Province occupies the first position as the province in Indonesia that has the largest area of oil palm plantations in Indonesia (Afrizal Putra and Elida, 2024; Habibullah Weningtyastuti and Risyanto Tampung, 2024).

Investment plays an important role in the development process because it determines the dynamics of development that can improve people's welfare (Corlet Walker et al., 2021; Ngan et al., 2022; Saleh et al., 2020; Shah and Shah, 2024). If the investment process goes well, the economy will grow well as long as the investment process produces efficient output (Mhamed et al., 2023; Zhang and Dilanchiev, 2022; Zou et al., 2022). Basically, investment activities can be carried out by the community, government and private sector (Gnych et al., 2020; Joudyian et al., 2021; Wahyono et al., 2022). Investment in Dumai City is developed to provide convenience for investors in investing their business (Yuslaini et al., 2023a,b; Yuslaini and Maulidiah, 2024).

Domestic investment is the use of domestic capital for businesses that promote economic development in general (Acquah and Ibrahim, 2020; Appiah et al., 2023; He and Yoo, 2024; Osei and Kim, 2020). Foreign investment is foreign direct investment made in accordance with or based on the provisions of Indonesian law, in the sense that the owner of the capital directly bears the risk of the investment (Djokoto et al., 2024; He and Yoo, 2024; Maharani and Santiago, 2021; Milani, 2021).

Ideally, the investment realization should increase to maintain a conducive investment climate. Dumai City's largest investment achievement was in the Palm Oil derivative industry sector as an advanced form of joint venture for the development of new Palm Oil products (Hassan et al., 2024; Septiarini et al., 2021; Syahza and Irianti, 2021; Vagtborg, 2024).

Based on the results of research mapping with 108 data using the help of VOSviewer software, it is known that research on investment fluctuations in the Palm Oil industry and is still rare especially in the research locus in Dumai City with keywords * AND palm AND oil * AND *investment * AND *impact *. In the trend of newly published previous research issues related to the topic of this research based on the mapping in Figure 1, it shows that the issue of fluctuations in the palm oil industry and the impact on socio-economics is still new to research, so this is the reason for the research to raise the research topic of fluctuations in the palm oil industry in the city of Dumai: the impact on the socio-economy of the community.

VOSviewer is a free software designed to build and visualize bibliometric maps. These maps can show relationships between



Empirical evidence based on in-depth interview with various stakeholders in the Indonesian palm oil industry indicates that the development of the RSPO sustainability standards is perceived to be in favor of a particular interest group due to the asymmetrical power and unbalanced control structure of the stakeholders. Thus, the powerful stakeholders are able to exercise imperative power over other stakeholders, to the extent that it actually contradicts the others' interests. This paper puts forward the notion that a more equitable governance system should be developed through the introduction of the reward system on the CSPO transaction. The reward system can demonstrate the original motivation of the RSPO toward consensus among all stakeholders to equally contribute in the implementation of sustainability Principles and Criteria (P and C) and standards

The purpose of this research is to see the realization of oil palm investment both domestic planting and foreign planting for the welfare of the community. Theoretical contribution as a reference for further research that wants to examine the same topic, namely the palm oil industry, and also contributes as input for the Dumai City government in making investment policies and domestic and foreign labor absorption such as local regulations so that they can contribute to the welfare of the community.

This study uses an exploratory qualitative approach, namely by using a literature review (Creswell and Poth, 2018). This will provide an in-depth analysis of research elements that cannot be measured with numbers. Furthermore, qualitative results are

obtained through Nvivo 12 Plus software. This method was chosen because of the large amount of secondary data related to palm oil industry investment in Dumai City, Indonesia such as government websites, electronic documents, digital reports, palm oil industry statistical studies, and also social media trends. Therefore, the purpose of this study is to investigate how the palm oil sector affects the socio-economic conditions of the people of Dumai City, Indonesia. The purpose of this study is to This study examines the impact of fluctuations in the palm oil industry on the social and economic vulnerability of urban communities, focusing on Dumai City, Indonesia. The research location was conducted in Dumai City, Indonesia because it has a very strategic location, namely the busiest shipping lane in the world, for national Dumai has the Indonesian Port (PELINDO) which is a State-Owned Enterprise (BUMN), Dumai is a downstream palm oil city, namely an industrial city, besides that Dumai City is also located on the international trade route between three countries, namely Malaysia, Singapore, Thailand.

2.1 Methods for gathering data

2.1.1 Design

The data of this research were collected through literature study, field observation, literature review, and government document survey. This research is based on literature study, documentation, and field observation. This research examines the fluctuation of the palm oil industry toward the social and economic vulnerability of urban communities, focusing on Dumai City, Indonesia using data and information from reliable and trustworthy sources. Here are some steps in data collection are as follows:

With the use of Nvivo 12 Plus software and following the standard protocol for evaluating qualitative approaches, the concepts are separated into three groups, specifically (1) Data collection, which is collecting as much data as possible and looking for information in the field and observed and recorded, (2) Collecting data through field observations is called observation data, (3) Documentation study is the process of gathering all pertinent data about research issues by examining and comparing existing documents

Three stages are used to analyze data, namely the first stage includes data collection such as data import, data processing and data categorization. The second stage includes coding, data analysis, project map creation and data visualization. Analysis of document results is collected in the third stage. Starting with identifying, tracing, collecting and mapping digital data from research field notes, government documents and digital media

2.2 Data analysis

Interactive analytic approaches were employed to acquire and interpret qualitative data. The method in conducting this approach will be explained through the presentation and verification of data and conclusion. Nvivo 12 Plus software was also utilized to aid in this investigation. Furthermore, this data analysis was carried out

by previous research trends related to investment. Utilizing Nvivo 12 Plus software, this was found and examined. The data analysis hierarchy can be found in [Figure 2](#).

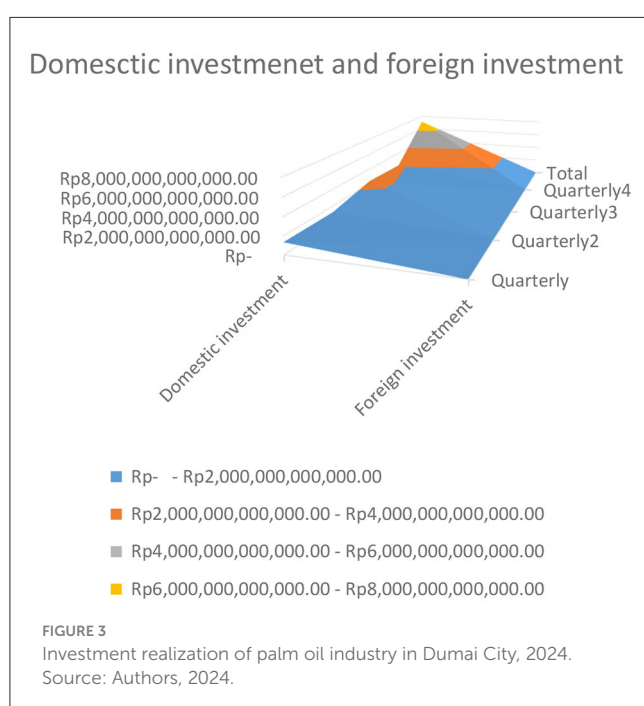
3 Results and discussion

3.1 The impact of investment fluctuations in the palm oil industry in Dumai City, Indonesia

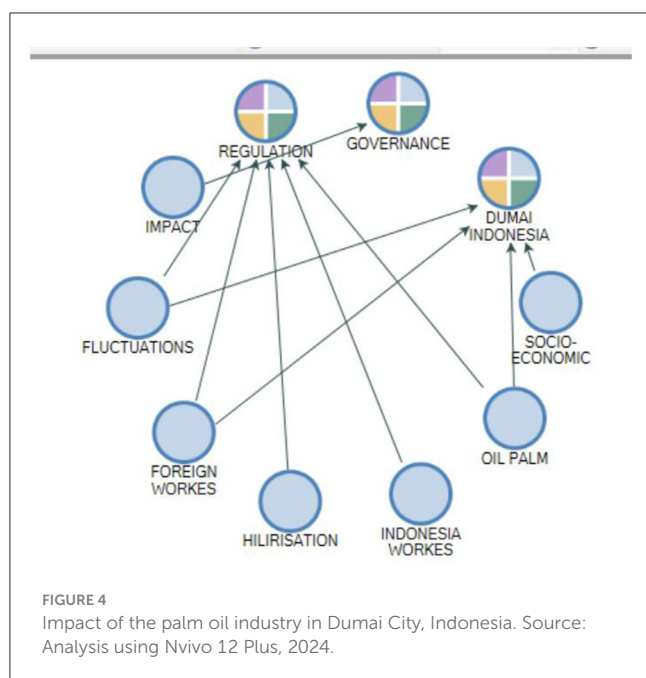
There are three sections of land within the Dumai Industrial Estate (KID). The draft Regional Spatial Plan (RTRW) for 2011–2032, which states that the total land area is 3,829.19 Ha, is the basis for identifying this land. Of this total, 1,860 Ha are under the company's control, 1,969 Ha are available, and 179.2 Ha are owned by the Dumai City Government, which is divided into 5 lots of land with an area of each (77. 941m², 90,000m², 674. 873m², 311,009m², and 413,500m²) KID has an industrial reserve area of 1,288.88 With so much land still available, KID is still able to accommodate industrial business units for every investor who wants to be involved in the investment climate in the KID area. Furthermore, to support the distribution of its products, KID has a dock facility that is very potential for the geographical position of Dumai City which is directly facing the Malacca Strait. Overall, the impact of KID's activities does not have a progressive contribution to the government. Dumai City is designated as a National Activity Center (PKN) with direct links to Malaysia, Thailand and Singapore.

Therefore, Dumai City has become a crossing point for sending Indonesian Migrant Workers (TKI) abroad. Due to Dumai City's close international connections, foreign ships will soon travel through its waterways. Dumai City has been recognized as a collecting center for inter-regional production distribution and as a National Strategic Activity Center (PKSN). Upstream industries are sent in the form of raw or processed materials, while Dumai City still does not have a special terminal to accommodate them. Based on the researcher's opinion, the condition confirms the lack of economic infrastructure as an important aspect that supports accelerated growth in various aspects of the economy. Economic infrastructure, in the form of infrastructure in real or physical form to support. A region's pace of economic growth and societal welfare will be higher if its infrastructure system is more complete, and vice versa. One could argue that because infrastructure is a major factor in economic growth, it is crucial to a nation.

The highways connecting Dumai City to other cities at the regional level are still poor and require improvement in terms of both quality and functionality, in keeping with the research area that the land transport network is still insufficient. The road, its capacity and carrying capacity which will be very useful in encouraging the growth rate of Palm Oil industry investment that will boost its own regional economy. To expedite the barrier-free land transport system, a toll road linking Pekanbaru, Duri, and Dumai exists. Easy access to transportation to Dumai City will benefit those who choose to enter the city and make short- and long-term investments, particularly in the palm oil sector, which is the result of oil palm plantations in the province of Riau. Fluctuations in the climate of oil palm investment in sustainable



In addition, increasing regional income from investment can be allocated to the development of social infrastructure such as hospitals, schools, and other public facilities. Increasing people's purchasing power can also increase access to health and education services. Declining Investment, declining local revenues can limit the ability of city governments to provide and improve public



services. Declining community incomes can also reduce their access to basic services, impacting quality of life and social welfare.

Through a combination of government policies, oil palm rejuvenation programs, environmental law enforcement, and community empowerment, Dumai City is trying to prevent the palm oil industry from disrupting the city. This aims to ensure that financial and non-financial resources are combined consistently and strategically to increase the capacity of urban systems. Without investment stability, cities will be more vulnerable to the negative impacts of shocks, slowing or even hindering the process of recovery and sustainable development, and being unable to maintain essential functions and improve the wellbeing of residents in the long term.

The fluctuation of investment in the palm oil industry in Dumai City has a huge impact on the socio-economy of the community such as low gross regional income, few jobs for both domestic and foreign employees, so investment in the palm oil industry does not have a positive impact on the welfare of the people of Dumai city.

In fact, large palm oil investments do not have a positive impact on socio-economic welfare and employment absorption in the region. Limited Labor Needs. Although planting and the initial phase of oil palm cultivation require a lot of labor, labor requirements for maintenance and harvesting are usually lower due to the use of more efficient technology. Out-of-Country Labor: companies often use labor from out-of-town for reasons such as work discipline, specific skills, or to avoid social problems with local communities. This limits employment opportunities for indigenous people.

Table 1 shows that Dumai City is ranked first in terms of investment realization. Therefore, it can be seen that Dumai City is one of the cities that has its own attraction for investment, especially the Palm Oil industry. The Palm Oil industry is a downstream of Palm Oil investment, this is not the case even though Dumai is

one of the largest industrial cities in Riau Province. The growth of the investment climate is quite good. However, it has not yet had a positive impact on the community.

One of the indicators to measure the level of accelerated economic development of a region is GRDP (Adrangi and Kerr, 2022; Chen and Huo, 2022; Lowder et al., 2021). GRDP is the final product of goods and services produced in a region with the support of production factors in the region according to the development of prices and constant prices. ADHB and ADHK GRDP for 17 business fields form the GRDP value generated in the region. By looking at the development of the ADHB GRDP value of Dumai City, we can see the movement of community economic activities caused by increased production and prices of goods and services, sectoral and regional economic structures, as well as the contribution of Dumai City to the regional economy and the level of concentration and equity of the regional economy in Riau Province. With oil and gas, ADHB GRDP increased from 17.49 trillion in 2010 to 36.32 trillion in 2020 with an average growth of 7.64 per cent per year. This increase shows the development of community economic activities, such as an increase in the amount of production and prices of goods and services (Rimmer et al., 2021; Saleh et al., 2020; Yang and Khan, 2022).

The manufacturing industry was the sector that experienced the highest ADHB GRDP growth, up from 17.49 trillion in 2010. The ADHB GRDP value increased the least in the corporate services sector, which in 2010 was only Rp. 710 million but has increased to Rp. 1,630 billion in 2020. GRDP is calculated at constant prices and analyses economic growth, regional productivity, and regional economic structure in both sectoral and regional economic structures. To assess the development goals and economic performance of a region, economic growth is an important measure (Andriansyah Nurwanda and Rifai, 2023; Belmonte-Ureña et al., 2021; Coscieme et al., 2020; Eisenmenger et al., 2020; Xiu et al., 2022). To eliminate the price increase factor, ADHK GRDP growth is used to measure economic growth in a particular base year. If the level of economic activity in the year in question is higher than the previous year, the economy is said to be growing. The benefits of analyzing economic growth include.

1. Knowing the economic progress as a result of regional development in a certain period of time.
2. Establish a typology of regional development, also known as a class typology.
3. Plan for regional revenue projection and forecasting for regional or sectoral development planning.
4. Understand the resources of economic growth.
5. Basis for determining investment requirements.
6. Basis for generating business forecasts and regional economic targets.

High population expansion followed by rapid economic growth does not always translate into positive outcomes. Particularly if rapid population expansion is not accompanied by the availability of highly skilled labor, productivity will drop, resulting in underdevelopment and poverty.

Aspects of how investment affects local communities and the welfare of Dumai City, including positive impacts such as job creation: investment, especially in industries such as palm oil,

TABLE 1 Investment realization based on location in Riau Province, Indonesia.

No	Regency/City	Project	Investment		
			Investmen in Rupiah (Rp)	Indonesian workers	Foreign workers
1	Dumai	75	3.270.887.900.000,-	304	2
2	Siak	77	2.592.474.200.000,-	1.825	-
3	Indragiri Hilir	71	2.253.775.700.000,-	2.221	2
4	Indragiri Hulu	68	1.916.065.800.000,-	236	-
5	Rokan Hulu	57	1.086.709.000.000,-	1.807	-
6	Pekanbaru	511	1.071.147.000.000,-	812	-
7	Pelalawan	67	924.096.500.000,-	236	-
8	Kampar	212	790.776.200.000,-	399	3
9	Kuantan Singingi	17	328.030.500.000,-	13	-
10	Bengkalis	122	199.418.400.000,-	132	-
11	Rokan Hilir	27	131.185.600.000,-	1.786	-
12	Kep. Meranti	7	6.220.3000.000,-	2	-
	Total	1.311	14.480.787.100.000,-	9.695	7

Source: Riau Provincial Government, 2024.

can open up many new jobs for local communities. This can increase household income and reduce unemployment. Increased Regional Income: increased taxes and city government levies will result in increased investment. These funds can be used to build infrastructure, public facilities, and community welfare programs. Infrastructure Development: the development or improvement of supporting infrastructure, such as roads, ports, electricity, and clean water, which benefit the entire community, is often carried out after investment. This commitment is evident through the development of the Integrated Industrial Estate by Pertamina Patra Niaga. Community Skills and Capacity Building: growing industrial sectors may require a workforce with specialized skills. To meet these needs, local communities must receive training and capacity building.

The risk of high volatility and investment fluctuations creates economic uncertainty, as well as the impact of investment fluctuations on the long-term sustainability of regional economic stability. An increase in GRDP, an increase in unemployment, and a decrease in people's purchasing power can be caused by a significant decrease in investment. Conversely, if investment increases rapidly without proper planning, it can lead to inflation and economic overheating. This can happen if production capacity and infrastructure are inadequate. Dependence on Certain Sectors: If investment is focused on one or two dominant industries, such as the processing industry or oil and gas, changes in these sectors will greatly affect the overall stability of Dumai's economy. Social Development and Community Welfare such as Job Uncertainty: investment fluctuations create uncertainty about job availability; when investment is sluggish, layoffs may increase, leading to social problems such as poverty and inequality; conversely, investment surges may attract labor from outside the region, increasing pressure on local social facilities and accommodation. If local governments and businesses focus too much on attracting volatile short-term investment, they may under-invest in developing new, more stable and

sustainable sectors in the future. This could hamper economic diversification efforts.

3.2 Increase in local labor

The goal of the government is the welfare and benefit of the people as something that has value, aspirations from the community itself, beliefs held in government strategies. In this goal, researchers argue that the government's strategy has not been maximized in increasing investment in the Palm Oil industry. Fluctuating investment will certainly have a negative impact on society such as a decrease in GRDP, affecting the absorption of foreign investment labor as in Table 2.

From Table 2, it is explained that employment is still small compared to other city districts, such as Siak District with investment realization not much different, but it absorbs a lot of labor. Meanwhile, the top position was in Indragiri Hilir Regency with a labor absorption of 11,726. However, in contrast to Dumai City, it is dominated by foreign labor. Although the absorption of PMDN labor also exists in Dumai City, the number of foreign labor absorbs more than the absorption of Indonesian labor. This will certainly affect the GRDP of Dumai City. In the absorption of labor, some companies whose tools are imported from abroad, where the company buys tools and experts from abroad, such as from Singapore and Malaysia. With a sophisticated machine, it only requires a small workforce, namely only 1 person who operates with the system.

In the existing pattern of labor recruitment through online and open to the public, this provides opportunities for the general public, not only natives of Dumai City but outside, even outside the island of Sumatra. Dumai City does not provide many job opportunities for large companies such as Pelindo, PT Wilmar Group, PT Biomass and other large companies, because the company has prepared experts from the company itself. This

TABLE 2 Foreign labour absorption in Dumai city in 2024.

No	Regency/City	Project	Foreign investment		
			Investment in Rupiah (Rp)	Indonesian workers	Foreign workers
1	Pelalawan	188	1.803.130.900.000,-	894	6
2	Indra Giri Hulu	200	2.835.677.000.000,-	1.396	30
3	Dumai	257	6.461.259.700.000,-	1.859	60
4	Bengkalis	263	2.051.582.800.000,-	1.474	50
5	Siak	177	5.294.657.200.000,-	6.657	30
6	Rokan Hilir	69	1.563.833.300.000,-	2.392	31
7	Rokan Hulu	170	2.260.203.300.000,-	170	11
8	Kampar	653	2.538.272.500.000,-	6.038	6
9	Pekanbaru	1.168	3.344.972.100.000,-	2.240	14
10	Kuantan Singingi	54	555.060.000.000,-	209	13
11	Indragiri Hilir	69	7.439.442.800.000,-	11.726	39
12	Kep. Meranti	74	191.860.400.000,-	54	12
	Total	561	35.972.913.500.000,-	35.114	372

Source: Riau Provincial Government, 2024.

means that there is free competition between local people and people outside the Dumai City area. This condition becomes the Government's homework, one of which is to increase the competence or capacity of human resources, in addition to encouraging the expansion of employment opportunities for local people, as a real effort to cut the unemployment rate. The government's goal in increasing investment in the Palm Oil industry is to prosper the community. With the investment in Dumai City, it will be directly proportional to the absorption of labor, one of the government's strategies in increasing investment in labor absorption through Regional Regulations and Dumai Mayor Regulations in labor recruitment such as 70% for local labor and 30% for outside labor. Investment in the Palm Oil industry is growing and has a positive impact on society. However, in reality, the absorption of labor is very small, because the company has used machinery imported from abroad, so the absorption of labor is small, so the positive impact on the community is still not optimal.

4 Conclusion

The impact of fluctuations in the palm oil sector on the socio-economic income of the community in Dumai City, Indonesia. The realization of oil palm investment has a significant impact on the local and national workforce, as well as the community's social and economic aspects. It also attracts more foreign labor. Three perspectives are used to assess the effects of sustainable development: social, economic, and environmental. Labor absorption in Dumai City is still less than other districts, but investment realization in Dumai City is much greater than other districts such as Indragiri, Rokan Hilir and others.

The employment in foreign investment in Dumai City is still not optimal, because labor recruitment is not only for local

people but comes from outside Dumai City, even for strategic positions filled by foreign workers. Meanwhile, local people are mostly placed in non-strategic positions, meaning that local people are placed as workers who dominantly fill the position of physical workers. above, it is explained that the absorption of labor is still small compared to other city districts, such as Siak Regency with investment realization not much different, but it absorbs a lot of labor. Meanwhile, the top position was in Indragiri Hilir Regency with a labor absorption of 11,726. However, in contrast to Dumai City, it is dominated by foreign labor. Although domestic labor absorption also exists in Dumai City, the number of foreign labor absorbs more than the absorption of Indonesian labor. This will certainly affect the GRDP of Dumai City which fluctuates.

Based on research that has been done while taking into account the limits of the previously mentioned studies. Therefore, we urge that more research be done. Specifically, we offer suggestions for future researchers to look into additional tactics that should be adopted to increase both domestic and foreign investment in palm oil. Second, recommendations for additional study on the pentahelik's function in stabilizing the investment climate and the policies of the Dumai city government regarding investment and hiring practices for both foreign and local workers.

Although the palm oil industry makes a significant economic contribution, especially for producing countries such as Indonesia, its impact on the environment is often a major concern. Land clearing for oil palm plantations involves the complete clearing of primary and secondary forests. This is one of the main factors causing deforestation in the tropics. Deforestation destroys the natural habitat of many animal and plant species, including rare and endangered species such as orangutans, Sumatran tigers, Sumatran elephants, and Sumatran rhinos. This can lead to species extinction and disrupt the balance of the ecosystem. The use of chemicals, pesticides, herbicides, and chemical

fertilizers on plantations can pollute the soil and surrounding water sources. These chemical residues can enter rivers and groundwater, damage aquatic ecosystems, and can be harmful to human health. Establishing oil palm plantations on peatlands is particularly dangerous because it involves draining the peat. Peatlands store a lot of carbon, and when they are drained and burned, they release large amounts of carbon dioxide (CO₂) into the atmosphere, which contributes to global warming and climate change.

The limitations of this study include the fact that there is still a lot of complete information that has not been obtained regarding the impact of investment in the palm oil industry on the socioeconomic status of the people of Dumai City in terms of sustainable development. However, the researchers remain committed to obtaining and exploring deeper information that is relevant and supports this research and ensure that the findings remain objective and may reveal new facts and insights in the field of palm oil industry investment. Qualitative methodologies are extremely useful for understanding the complexity of human experience, meaning, and social context. However, like all research approaches, it is important to remember that qualitative data analysis (such as thematic or narrative analysis) is a cognitively intensive, time-consuming, and often non-linear process. It involves repeated reading, coding, and pattern discovery. In-depth interviews, active observation, and document analysis take a lot of time to collect. These limitations do not diminish the value of qualitative research. Rather, recognizing these limitations allows researchers to design better studies, report results more accurately, and identify areas of research that can deepen or complement existing understanding.

In the palm oil hub of Dumai City, Indonesia, there are several ways the government can play a positive role in industrial and urban development. Ease of licensing that simplifies and accelerates the licensing process for investment in the palm oil sector including factory construction, land expansion in accordance with sustainability regulations, and development of supporting infrastructure. In terms of sustainability and environmental policies, environmental law enforcement is carried out by strengthening law enforcement against illegal deforestation and land burning, and ensuring that all environmental requirements are complied with. Encourage cultivation practices that do not damage peatlands and protect biodiversity around plantations for peatland and biodiversity conservation. Efficient Waste Management to encourage the use of effective and environmentally friendly waste processing technologies and to generate renewable energy from oil palm biomass. In the division of land for oil palm plantations, consider the carrying capacity of the environment and ensure sustainable spatial planning. Industrial development must also improve the welfare of the surrounding community through partnerships and farmer empowerment, encourage a fair partnership model between companies and plasma farmers, and empower farmers through farmer groups and cooperatives. This is part of local social and economic development. Local Economic Diversification: increase economic diversification in palm oil center areas by developing other sectors such as horticulture, tourism, and creative industries.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Author contributions

NY: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. SM: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. AH: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing.

Funding

The author(s) declare that financial support was received for the research and/or publication of this article. This research was funded by the Ministry of Research, Technology and Higher Education of the Republic of Indonesia (Kemenristekdikti) under Grant No. DRTPM-043/LL10/PG.AK/2024, and through a Derivative Contract No. DPPM-UIR/HN-P/2024 issued by Universitas Islam Riau, Indonesia.

Acknowledgments

We would like to thank the Ministry of Research, Technology and Higher Education of the Republic of Indonesia (Kemenristekdikti) for providing research and publication funding support. We also extend our gratitude to the Faculty of Social and Political Sciences, Universitas Islam Riau (UIR), for their institutional support. With their contributions, this research has been successfully completed and published.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Generative AI statement

The author(s) declare that no Gen AI was used in the creation of this manuscript.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated

organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

References

- Acquah, A. M., and Ibrahim, M. (2020). Foreign direct investment, economic growth and financial sector development in Africa. *J. Sustain. Finance Invest.* 10, 315–334. doi: 10.1080/20430795.2019.1683504
- Adrangi, B., and Kerr, L. (2022). Sustainable development indicators and their relationship to GDP: evidence from emerging economies. *Sustainability* 14:658. doi: 10.3390/su14020658
- Afrizal Putra, E. V., and Elida, L. (2024). Palm oil expansion, insecure land rights, and land-use conflict: a case of palm oil centre of Riau, Indonesia. *Land Use Policy* 146:107325. doi: 10.1016/j.landusepol.2024.107325
- Andriansyah Nurwanda, A., and Rifai, B. (2023). Structural change and regional economic growth in Indonesia. *Bull. Indones. Econ. Stud.* 59, 91–117. doi: 10.1080/00074918.2021.1914320
- Appiah, M., Gyamfi, B. A., Adebayo, T. S., and Bekun, F. V. (2023). Do financial development, foreign direct investment, and economic growth enhance industrial development? Fresh evidence from Sub-Sahara African countries. *Portuguese Econ. J.* 22, 203–227. doi: 10.1007/s10258-022-00207-0
- Arsyad, M., Amiruddin, A., Suharno, S., and Jahroh, S. (2020). Competitiveness of palm oil products in international trade: an analysis between Indonesia and Malaysia. *Caraka Tani J. Sustain. Agric.* 35:157. doi: 10.20961/carakatani.v35i2.41091
- Bahrudin Macdonald, K., Diprose, R., and Delgado Pugley, D. (2024). Scaling-up sustainable commodity governance through jurisdictional initiatives: political pathways to sector transformation in the Indonesian palm oil sector? *World Dev.* 176:106504. doi: 10.1016/j.worlddev.2023.106504
- Baka, W. K., Rianse, I. S., and la Zulfikar, Z. (2024). Palm oil business partnership sustainability through the role of social capital and local wisdom: evidence from palm oil plantations in Indonesia. *Sustainability* 16:7541. doi: 10.3390/su16177541
- Belmonte-Ureña, L. J., Plaza-Úbeda, J. A., Vazquez-Brust, D., and Yakovleva, N. (2021). Circular economy, degrowth and green growth as pathways for research on sustainable development goals: a global analysis and future agenda. *Ecol. Econ.* 185:107050. doi: 10.1016/j.ecolecon.2021.107050
- Chen, L., and Huo, C. (2022). The Measurement and Influencing Factors of High-Quality Economic Development in China. *Sustainability* 14:9293. doi: 10.3390/su14159293
- Corlet Walker, C., Druckman, A., and Jackson, T. (2021). Welfare systems without economic growth: a review of the challenges and next steps for the field. *Ecol. Econ.* 186:107066. doi: 10.1016/j.ecolecon.2021.107066
- Coscieme, L., Mortensen, L. F., Anderson, S., Ward, J., Donohue, I., Sutton, P. C., et al. (2020). Going beyond gross domestic product as an indicator to bring coherence to the sustainable development goals. *J. Clean. Prod.* 248:119232. doi: 10.1016/j.jclepro.2019.119232
- Creswell, J. W., and Poth, C. N. (2018). *Qualitative Inquiry Research Design: Choosing Among Five Approaches (Fourth)*. Thousand Oaks, CA: SAGE Publication, Inc.
- Deser, C., Lehner, F., Rodgers, K. B., Ault, T., Delworth, T. L., DiNezio, P. N., et al. (2020). Insights from Earth system model initial-condition large ensembles and future prospects. *Nat. Clim. Change* 10, 277–286. doi: 10.1038/s41558-020-0731-2
- Djokoto, J. G., Hysa, E., and Mansi, E. (2024). Foreign divestment and domestic investment in Eastern European countries. *Post-Communist Econ.* 36, 90–104. doi: 10.1080/14631377.2023.2237211
- Eisenmenger, N., Pichler, M., Krenmayr, N., Noll, D., Plank, B., Schalmann, E., et al. (2020). The Sustainable Development Goals prioritize economic growth over sustainable resource use: a critical reflection on the SDGs from a socio-ecological perspective. *Sustain. Sci.* 15, 1101–1110. doi: 10.1007/s11625-020-00813-x
- Gnych, S., Lawry, S., McLain, R., Monterroso, I., and Adhikary, A. (2020). Is community tenure facilitating investment in the commons for inclusive and sustainable development? *Forest Policy Econ.* 111, 102088. doi: 10.1016/j.forpol.2019.102088
- Go, Y.-H., and Lau, W.-Y. (2024). Terms of trade or market power? Further evidence from dynamic spillovers in return and volatility between Malaysian crude palm oil and foreign exchange markets. *North Am. J. Econ. Finance* 73:102178. doi: 10.1016/j.najef.2024.102178
- Habibullah Weningtyastuti, R., and Risyanto Tampung, M. (2024). "Gathering palm fruit, alternative job for orang rimba during climate crisis and poverty in Indonesia," in *Climate Crisis, Social Responses and Sustainability: socio-ecological Study on Global Perspectives* (Cham: Springer), 521–540. doi: 10.1007/978-3-031-58261-5_22
- Hassan, M. A., Farid, M. A. A., Zakaria, M. R., Ariffin, H., Andou, Y., Shirai, Y., et al. (2024). Palm oil expansion in Malaysia and its countermeasures through policy window and biorefinery approach. *Environ. Sci. Policy* 153:103671. doi: 10.1016/j.envsci.2024.103671
- He, Y., and Yoo, T. H. (2024). Financial development impact on domestic investment: does income level matter? *Cogent. Econ. Finance* 12:2321811. doi: 10.1080/2332024.2321811
- Hoang, A. T., Sandro Nižetić Olcer, A. I., Ong, H. C., Chen, W.-H., Chong, C. T., Thomas, S., et al. (2021). Impacts of COVID-19 pandemic on the global energy system and the shift progress to renewable energy: opportunities, challenges, and policy implications. *Energy Policy* 154:112322. doi: 10.1016/j.enpol.2021.112322
- Jeong, M., Kim, S., Yi, E., and Ahn, K. (2023). Market efficiency and information flow between the crude palm oil and crude oil futures markets. *Energy Strategy Rev.* 45:101008. doi: 10.1016/j.esr.2022.101008
- Joudyian, N., Doshmangir, L., Mahdavi, M., Tabrizi, J. S., and Gordeev, V. S. (2021). Public-private partnerships in primary health care: a scoping review. *BMC Health Serv. Res.* 21:4. doi: 10.1186/s12913-020-05979-9
- Lowder, S. K., Sánchez, M. V., and Bertini, R. (2021). Which farms feed the world and has farmland become more concentrated? *World Dev.* 142:105455. doi: 10.1016/j.worlddev.2021.105455
- Lugo-Arias, E., Lugo-Arias, J., Vargas, S. B., de la Puente Pacheco, M. A., Granados, I. B., Heras, C. B., and Triana Hernández, D. (2024). Determinants of the competitiveness of world palm oil exports: a cointegration analysis. *Trans. Corporations Rev.* 16:200063. doi: 10.1016/j.tncr.2024.200063
- Maharani, D. N., and Santiago, F. (2021). "Legal smuggling of share ownership using nominee arrangements associated with a violation of the negative investment lists," in *2nd International Conference on Business Law and Local Wisdom in Tourism (ICBLT 2021)*, 70–73. doi: 10.2991/assehr.k.211203.016
- Mhamed, M., Kabir, M. H., and Zhang, Z. (2023). "Developments of the automated equipment of apple in the orchard: a comprehensive review," in *Towards Unmanned Apple Orchard Production Cycle: Recent New Technologies*, eds. Z. Zhang and X. Wang (Singapore: Springer), 1–49.
- Milani, N. P. (2021). "Foreign direct investment and sustainable development," in *Reduced Inequalities* (Springer), 254–264. doi: 10.1007/978-3-319-95882-8_22
- Ngan, S. L., Er, A. C., Yatim, P., How, B. S., Lim, C. H., Ng, W. P. Q., et al. (2022). Social sustainability of palm oil industry: a review. *Front. Sustain.* 3:855551. doi: 10.3389/frsus.2022.855551
- Osei, M. J., and Kim, J. (2020). Foreign direct investment and economic growth: is more financial development better? *Econ. Modell.* 93, 154–161. doi: 10.1016/j.econmod.2020.07.009
- Pacheco, P., Schoneveld, G., Dermawan, A., Komarudin, H., and Djama, M. (2020). Governing sustainable palm oil supply: disconnects, complementarities, and antagonisms between state regulations and private standards. *Regul. Governance* 14, 568–598. doi: 10.1111/rego.12220
- Petri, H., Hendrawan, D., Bähr, T., Musshoff, O., Wollni, M., Asnawi, R., et al. (2023). Replanting challenges among Indonesian oil palm smallholders: a narrative review. *Environ. Dev. Sustain.* 26, 19351–19367. doi: 10.1007/s10668-023-03527-z
- Rimmer, M. A., Larson, S., Lapong, I., Purnomo, A. H., Pong-Masak, P. R., Swanepoel, L., et al. (2021). Seaweed aquaculture in Indonesia contributes to social and economic aspects of livelihoods and community wellbeing. *Sustainability* 13:10946. doi: 10.3390/su131910946
- Saleh, H., Surya, B., Annisa Ahmad, D. N., and Manda, D. (2020). The role of natural and human resources on economic growth and regional development: with discussion of open innovation dynamics. *J. Open Innovation Technol. Mark. Complexity* 6:103. doi: 10.3390/joitmc6040103
- Septiari, A., Sunyoto, A., Hamdani, H., Kasim, A. A., Utaminigrum, F., Hatta, H. R., et al. (2021). Machine vision for the maturity classification of oil palm fresh fruit bunches based on color and texture features. *Sci. Horticulturae* 286:110245. doi: 10.1016/j.scienta.2021.110245

- Shah, S. S., and Shah, S. A. H. (2024). Trust as a determinant of social welfare in the digital economy. *Soc. Netw. Anal. Min.* 14:79. doi: 10.1007/s13278-024-01238-5
- Snashall, G. B., and Poulos, H. M. (2023). 'Smallholding for Whom?': the effect of human capital appropriation on smallholder palm farmers. *Agric. Hum. Values* 40, 1599–1619. doi: 10.1007/s10460-023-10440-8
- Syahza, A., and Asmit, B. (2020). Development of palm oil sector and future challenge in Riau Province, Indonesia. *J. Sci. Technol. Policy Manage.* 11, 149–170. doi: 10.1108/JSTPM-07-2018-0073
- Syahza, A., and Irianti, M. (2021). Formulation of control strategy on the environmental impact potential as a result of the development of palm oil plantation. *J. Sci. Technol. Policy Manage.* 12, 106–116. doi: 10.1108/JSTPM-06-2019-0059
- Tefurukwa, O. W., and Ahafiany, J. T. (2025). Ghost workers in the Tanzanian public sector: socio-economic impacts and governance implications. *J. Contemp. Governance Public Policy* 6, 39–54. doi: 10.46507/jcgp.v6i1.672
- Thongchul, N., Songserm, P., and Ngaosuwan, K. (2022). "Whole crop feedstocks in biorefinery: a common classification," in *A-Z of Biorefinery* (Elsevier), 35–77. doi: 10.1016/B978-0-12-819248-1.00024-5.
- Vagtberg, F. H. (2024). "Corporate responsiveness and sustainability transition: insights from a Danish–Malaysian Palm Oil Multinational," in *Sustainable and Resilient Global Practices: Advances in Responsiveness and Adaptation* (Emerald Publishing Limited), 149–191. doi: 10.1108/978-1-83797-611-920241007
- Wahyono, Y., Hadiyanto, H., Gheewala, S. H., Budihardjo, M. A., and Adiansyah, J. S. (2022). Evaluating the environmental impacts of the multi-feedstock biodiesel production process in Indonesia using life cycle assessment (LCA). *Energy Convers. Manage.* 266:115832. doi: 10.1016/j.enconman.2022.115832
- Xiu, J., Zang, X., Piao, Z., Li, L., and Kim, K. (2022). China's low-carbon economic growth: an empirical analysis based on the combination of parametric and nonparametric methods. *Environ. Sci. Pollut. Res.* 30, 37219–37232. doi: 10.1007/s11356-022-24775-y
- Yang, X., and Khan, I. (2022). Dynamics among economic growth, urbanization, and environmental sustainability in IEA countries: the role of industry value-added. *Environ. Sci. Pollut. Res.* 29, 4116–4127. doi: 10.1007/s11356-021-16000-z
- Yuslaini, N., and Maulidiah, S. (2024). Governing sustainability: land use change impact on the palm oil industry in Riau Province, Indonesia. *Otoritas J. Ilmu Pemerintahan* 14, 115–130. doi: 10.26618/ojip.v14i1.14304
- Yuslaini, N., Sumadinata, R. W. S., Fedryansyah, M., Abdillah, A., Prianto, A. L., Febriyanti, D., et al. (2023a). Sustainable investment strategies in the palm oil industry in Indonesia. *J. Infrastruct. Policy Dev.* 7:2288. doi: 10.24294/jipd.v7i3.2288.
- Yuslaini, N., Suwaryo, U., Deliaroor, N. A., and Sri Kartini, D. (2023b). Palm oil industry and investment development in Dumai City, Indonesia: a focus on local economy development and sustainability. *Cogent. Soc. Sci.* 9:2235780. doi: 10.1080/2332023, 2235780.
- Zhang, Y., and Dilanchiev, A. (2022). Economic recovery, industrial structure and natural resource utilization efficiency in China: effect on green economic recovery. *Resour. Policy* 79:102958. doi: 10.1016/j.resourpol.2022.102958
- Zou, L., Shen, J. H., Zhang, J., and Lee, C. (2022). What is the rationale behind China's infrastructure investment under the Belt and Road Initiative. *J. Econ. Surv.* 36, 605–633. doi: 10.1111/joes.12427