JISDeP
The Journal of Indonesia Sustainable Development Planning

Vol. 2 No. 1
April 2021

E-ISSN: 2722-0842
P-ISSN: 2721-8309

journal.pusbindiklatren.bappenas.go.id

Kementerian PPN/ Bappenas

Supported by:

PPPI

Kementerian PPN/
Bappenas

JSDeP

The Journal of Indonesia Sustainable Development Planning

VOL. 2 NO. 1 - APRIL 2021

Supported by

PPPI

Cover

Design : Hafidh Aditama

Photo : Karsten Wurth (unsplash.com)

JISDeP
The Journal of Indonesia Sustainable Development Planning

THE JOURNAL OF INDONESIA SUSTAINABLE DEVELOPMENT PLANNING (JISDeP)

Published by Centre for Planners' Development, Education, and Training (Pusbindiklatren), Ministry of National Development Planning/ National Development Planning Agency (Bappenas), Republic of Indonesia

Address : Jalan Proklamasi 70, Central Jakarta, Indonesia 10320
Phone : +62 21 31928280/31928285/31928279
Fax : +62 21 31928281
E-mail : journal.pusbindiklatren@bappenas.go.id

Available online at

journal.pusbindiklatren.bappenas.go.id

E-ISSN: 2722-0842 (online)
P-ISSN: 2721-8309 (print)

Supported by
Indonesian Development Planners Association (PPPI)

Indexed by

MORAREF · Google Scholar · Dimensions · Crossref · BASE Bielefeld Academic Search Engine · GARUDA GARBA RUJUKAN DIGITAL

Editorial Team

JISDeP
The Journal of Indonesia Sustainable Development Planning

EDITOR IN CHIEF

EDITORIAL BOARD

PRODUCTION TEAM

Peer Reviewers

JISDeP
The Journal of Indonesia Sustainable Development Planning

Vol. I No. 2- August 2020
E-ISSN: 2722-0842 | P-ISSN: 2721-8309

Available online at
http://journal.pusbindiklatren.bappenas.go.id/

Kementerian PPN/ Bappenas

Contents

Vol. 2 No. 1- April 2021

E-ISSN: 2722-0842 | P-ISSN: 2721-8309

Available online at
http://journal.pusbindiklatren.bappenas.go.id/

Editorial Notes

Vaccine: New Hope, but It Is Not a Panacea of Pandemic

COVID-19 has been a major global health problem. As a pharmaceutical intervention had not yet been available, curbing the spread of COVID-19 has depended on the people's protective behaviors. Although the governments throughout the world encouraged people to wear a face mask, adhere to social distancing, and wash hands using sanitizers, some ignored such a call (Adiyoso & Wilopo, 2020). Since vaccination has been rolled out to populations near the end of 2020, it instills a new hope for battling against COVID-19. However, the vaccine is not a panacea or end of the pandemic.

COVID-19 vaccine has been available, yet it is limited. Vaccine development is essential, and past experiences have shown that vaccines save millions of lives. The race to find a safe and successful COVID-19 vaccine attracted people from all over the world. However, the complexity of COVID-19 virus has made vaccine development incredibly challenging. COVID-19 vaccines are produced to meet high quality, safe, and efficacy requirements as all other vaccines. The effects of COVID-19 vaccines are first tested in the laboratory, including on animals, before tried on human volunteers (WHO, 2021).

According to WHO, at least seven different vaccines have been rolled out in some countries since February 2021 (WHO, 2021). Vaccination is prioritized for vulnerable people in all countries. Vaccines create immunity to minimize the risk of getting a disease. Our body's immune system reacts when we receive a vaccine. Every year, vaccines prevent 2-4 million deaths from diseases such as diphtheria, tetanus, pertussis, influenza, and measles, while around 200 additional vaccine candidates are being developed simultaneously (WHO, 2021). At the same time, a new variant of coronavirus has been discovered (Nikkei staff writers, 2021).

Vaccination is regarded as one of the most effective public health interventions, but some people believe it is dangerous and unwarranted. The concept of risk communication has explained why people neglect to protect themselves from such pandemic by taking the vaccine. Previous studies revealed that protective behavior is determined by complex factors such as demographics, the chance of getting victim, feeling severity, experiences, emotion, self-efficacy, and subjective norm (Dubé et al., 2013). In one place, for example, past experiences are the dominant factor in influencing people to take certain behaviors.

In other populations, variables such as religions, gender, subjective norm, and trust in leadership may affect their behavior to take vaccines. Immunization is an indisputable human right and an essential part of primary health care. It is also one of the most cost-effective health investments (Dubé et al., 2013). Vaccination is one of the best and most effective public health strategies for keeping people healthy. In case of a COVID-19 outbreak, vaccines also will foster social and economic benefits. However, vaccine hesitancy does exist in the community. Understanding the factors that determine vaccine acceptance is crucial. It is needed to trace the historical, political, and socio-cultural contexts. Vaccination decision-

ARTICLE INFO

Received: March 03, 2021
Received in revised form: March 03, 2021
Accepted: April 19, 2021

doi: 10.46456/jisdep.v2i1.117

JISDeP - The Journal of Indonesia Sustainable Development Planning
Published by Centre for Planners' Development, Education, and Training (Pusbindiklatren),
Ministry of National Development Planning/ National Development Planning Agency (Bappenas), Republic of Indonesia

Address: Jalan Proklamasi 70,
Central Jakarta, Indonesia 10320
Phone: +62 21 31928280/31928285
Fax: +62 21 31928281
E-mail:
journal.pusbindiklatren@bappenas.go.id

Supported by Indonesian Development Planners Association (PPPI)

making should be considered in a wider socio-cultural sense. Vaccination is a part of a broader social world, which means that several factors may contribute to vaccination acceptance.

While the development of vaccines against COVID-19 has continued even for a future pandemic, social behavior-based public health intervention should be promoted for a sustainable public health system. Policymakers should base their decision on evidence-based policymaking. Thus, it is crucial to foster the study preceding the pandemic. Besides, one of the best lessons learned from tackling COVID-19 is that cooperation among countries, regions, institutions, government agencies, communities, and individuals is necessary. Scientists from all over the world should work together to save lives and reduce the spreading of coronaviruses.

More efforts to promote vaccine benefits and risks and resolve problems with evidence-based information can help maintain public confidence in vaccines and health systems around the world. Media and social media play important roles in shaping and influencing people regarding public health measures promoted by the government. Measuring and tracking vaccine confidence levels and focusing on deliberate measures to build vaccine credence are critical steps in reducing vaccine reliance discrepancies

As warned by WHO, safe and reliable vaccines would be a game-changer (WHO, 2021), (Wardhana, 2020). We must continue to wear masks, keep a social distancing, and avoid crowds. There is also clear that the degree of effectiveness of the vaccine varies from individual to individual. Being vaccinated does not mean we may be careless and put ourselves and others at high risk. ***

Wignyo Adiyoso, S.Sos., MA., Ph.D.

(Editor in Chief)

References

Adiyoso, W., & Wilopo, W. (2020). Social Distancing Intentions to Reduce the Spread of COVID-19: The Extended Theory of Planned Behavior. *Research Square, Pre-Print*.

Dubé, E., Laberge, C., Guay, M., Bramadat, P., Roy, R., & Bettinger, J. A. (2013). Vaccine Hesitancy an Overview. *Human Vaccines & Immunotherapeutics*, *9*(8).

Nikkei staff writers. (2021). *Japan finds new COVID virus strain, distinct from UK and Africa types*. NIKKEI Asia. https://asia.nikkei.com/Spotlight/Coronavirus/Japan-finds-new-COVID-virus-strain-distinct-from-UK-and-Africa-types

Wardhana, D. (2020). Post-Pandemic Development: Sluggish or Rapid Recovery? *The Journal of Indonesia Sustainable Development Planning*, *1*(3), i–ii.

WHO. (2021). *COVID-19 vaccines*. WHO. https://www.who.int/emergencies/diseases/novel-coronavirus-2019/covid-19-vaccines

Vol. 2 No. 1- April 2021

E-ISSN: 2722-0842 | P-ISSN: 2721-8309

Available online at
http://journal.pusbindiklatren.bappenas.go.id/

Research Paper

Indonesian Voting from Abroad: Highly Educated Citizen Participation in the 2019 Election at Tokyo Polling Station

Sri Endah Pujiatin

Master of Economic Planning and Development Policy, Faculty of Economics and Business University of Indonesia, Depok, Indonesia
sriendah_puji@yahoo.com

ABSTRACT

The political rights of Indonesian citizens living abroad have been guaranteed by law since 1953 and implemented by a joint committee between the General Election Commission and the Ministry of Foreign Affairs. As a developing country with increasing democracy, Indonesia's external voting needs to be studied. Using the qualitative analysis of macro data and questionnaire survey in Tokyo, this study addresses the following questions: How is the implementation of external voting by the Indonesian government? How is the voter? How does the registration, administration, voting facilitation, and voting method influence voter participation in home country elections? The findings suggest that the government provides many resources to facilitate external voting. Nevertheless, survey results revealed that some facilitation was inadequate compare to the number of voters. Although highly educated citizens tend to have a high awareness of home country elections, problems in voting facilitation might prevent them from voting.

Keywords: external voting, participation in politic, institutional factors.

ARTICLE INFO

Received: February 03, 2021
Received in revised form: March 22, 2021
Accepted: April 16, 2021

doi: 10.46456/jisdep.v2i1.107

JISDeP - The Journal of Indonesia Sustainable Development Planning
Published by Centre for Planners' Development, Education, and Training (Pusbindiklatren), Ministry of National Development Planning/ National Development Planning Agency (Bappenas), Republic of Indonesia

Address: Jalan Proklamasi 70, Central Jakarta, Indonesia 10320
Phone: +62 21 31928280/31928285
Fax: +62 21 31928281
E-mail: journal.pusbindiklatren@bappenas.go.id

Supported by Indonesian Development Planners Association (PPPI)

1. Introduction

Many countries believe that citizens living abroad, similar to the citizens in their home country, should have the right to vote in their home country's elections. These non-residence citizens continue to grow. Department of Economic and Social Affairs of the United Nations (Department of Economic and Social Affairs United Nations, 2020) revealed that international migrants reached 272 million in 2019, and it is very important to guarantee their right to vote in elections. Several developed and developing countries have granted and facilitated the political rights of these expatriates. Despite differences in the regulation and implementation, a total of 115 countries have implemented external voting in their democratic practices, including Indonesia (Ellis et al., 2007). Indonesia, which started acknowledging external voting in 1953 (law number 7 of 1953), is one of the few countries that had adopted voting from outside the territory early on along with several developed countries such as the United Kingdom (1918), Norway (1921), United States (1942), Canada (1945), Australia (1949), Germany (1949), Iceland (1949), Finland (1958), and Sweden (1968) and is the first among developing countries (Sevi et al., 2020).

Granting the right to participate in politics for citizens living outside the territory of a country is part of the realization of goal 16 of the SDGs' 17 goals: strengthening an inclusive and peaceful society for sustainable development, providing access to justice for all, and building effective, accountable and inclusive institutions at all levels. Citizens who live outside the country's territory are a group of the population who must be given the same rights as citizens inside the territory in decision-making.

Indonesia has extensive experience in external voting implementation through overseas polling stations. In total, the Indonesian government conducted 16 external voting sessions (presidential and parliamentary elections) since 1971. Numerous polling stations were built at all embassies and consulates abroad to facilitate the voting. Based on the National Election Commission (KPU) report, 130 overseas polling stations were provided to facilitate more than 2 million overseas voters in the 2019 parliamentary and presidential elections. This exercise required considerable human resources and budgets, i.e., 556 personnel of the Overseas Election Committee (PPLN), 12,765 personnel of Overseas Voting Organizer Groups (KPPSLN), and 1,200 personnel of Voter Data Updating Committee (Pantarlih) (Kelompok Kerja Pembina Pemilihan Umum Luar Negeri, 2019). In addition, around 621 billion rupiahs were allocated to all overseas polling stations (Kelompok Kerja Pembina Pemilihan Umum Luar Negeri, 2019, pp. 171–174). The implementation of voting abroad has undergone several policy changes to increase public participation abroad in elections. Nevertheless, the level of citizen participation in the 2019 presidential elections was only 42.54 %.

There is a growing interest in external voting studies, but many of these studies focused on developed countries with long-established democracy, such as the United States, New Zealand, and Canada (Blais et al., 2019; Hanmer et al., 2015; Murray, 2012; Smith, 2010). However, research on the implementation of out-of-country voting in developing countries is still limited. No study specifically addresses the practice of polling stations abroad. Therefore, this study attempts to fill in the gap by exploring the implementation of external voting in Indonesia as a developing country with its long history of external voting implementation through overseas polling stations.

On the other hand, studies that focus on overseas citizen participation in home country elections are limited. Some studies describe several factors that influence overseas citizen participation in elections, for instance, institutional factors, type of election and voting method (Belchior et al., 2018), registration (Lafleur & Chelius, 2011), political factors, level of democracy (Belchior et al., 2018; Ciornei & Østergaard-Nielsen, 2020), political rights and civil liberty scores (Sevi et al., 2020), socioeconomic factors, GDP (Belchior et al., 2018; Sevi et al., 2020), neighborhood characteristics (Herrnson et al., 2015; Murray, 2012), and demographic factors such as age (Sevi et al., 2020).

Given the importance of the institutional factor and overseas citizen participation in elections, this study aims to explore the Indonesian government’s facilitation of external voting and its issues from the perspective of overseas voters with a focus on the Tokyo overseas polling station. This issue will be explored by answering the following questions: How is the implementation of external voting by the Indonesian government? How is the voter? How do the registration, administration, voting facilitation, and voting method influence voter participation in home country elections? For this purpose, the qualitative analysis of macro data and questionnaire surveys in Tokyo was used.

Literature Review

a. Vote from Outside of Territory

Extraterritorial voting becomes increasingly important as the growing number of migrant citizens and many countries start to acknowledge their political rights. Extraterritorial voting, which also called external voting, or out-of-country voting, is defined as "provisions and procedures which enable some or all electors of a country who are temporarily or permanently outside the country to exercise their voting rights from outside the territory of the country" (Ellis et al., 2007, p. 67). More than half the countries in the world have acknowledged their citizens voting from abroad. Collyer (2014), for instance, revealed that up till 2009, 129 countries had implemented external voting.

However, the application of external voting in each country is not necessarily the same; there are many variations. Among the 129 countries that have implemented it, 13 countries provide direct representation for expatriate citizens, 93 countries accommodate the voting at the host country, and 23 countries require their expatriate voters to return to their home countries to vote (Collyer, 2014). Other differences also lie in the type of election allowed for external voters, expatriate citizen requirements for voting rights, and the voting method used (Ellis et al., 2007).

Despite the increasing number of countries using this measure, voting from abroad is complex and poses many challenges. A common challenge faced is the difficulty in determining the actual number of citizens living abroad. Studies in some countries have found that the number of registered voters in each country does not reflect the actual eligible voters abroad (Alarcon Jr, 2012; Burgess & Tyburski, 2020; Ciornei & Østergaard-Nielsen, 2020; Hafizy, 2017; Smith, 2010). To address this challenge, some studies utilize various sources to compare the numbers of overseas citizens. One alternative source that is commonly used to better estimate the number of overseas citizens is the Migrant Stock data published by the United Nations (Burgess & Tyburski, 2020; Ciornei & Østergaard-Nielsen, 2020). The UN Migrant Stock provides the number of migrants by country of origin and destination, age, and gender, based on official data about foreign-born or foreign populations published by each country (Department of Economic and Social Affairs United Nations, 2020).

Furthermore, Ellis et al. (Ellis et al., 2007) revealed that differences in the social and cultural conditions of the host country compared to domestic and staff involved in external voting, who are mostly temporary, pose many challenges in voting work. Ellis et al. (Ellis et al., 2007) also added that external voting is difficult to implement because of the number of voters, their residences, and the voting system. Similarly, Hafizy (Hafizy, 2017) also revealed that different environmental settings in external voting cause election administrators and overseas voters to experience a higher level of difficulty than in the country of origin.

b. Voter Participation and Influencing Factors

There is a limited study that focuses on the participation of expatriate voters in domestic elections. A few studies have formulated certain demographic, institutional, socioeconomic, and political factors that influence expatriate voters' participation in their home country's politics (Belchior et al., 2018; Ciornei & Østergaard-Nielsen, 2020; Lafleur & Chelius, 2011; Sevi et al., 2020).

Institutional factors are believed to have a significant influence on increasing voter participation. One example is voting facilitation. Voting facilitation, such as the availability of voting via post, proxy, or internet (Belchior et al., 2018), considerably encourages the voters to participate because it saves their time and money, especially for those who live far from the polling station. Other important voting facilitations are the number and location of polling booths, access to information about voting, and logistical settings for voter registration (Bauböck, 2007). Despite their importance, due to their inaccessibility, Belchior et al. (2018) does not include these variables in his analysis.

Other studies have found other institutional factors, such as registration restrictions affecting voter participation. For instance, Lafleur & Chelius (2011) states that stricter regulations on voter registration significantly influenced the level of external voter participation in the 2016 Mexican presidential election. He also discusses other demographic and socioeconomic variables as contributing factors for the low overseas participation in the Mexican election. Correspondingly, Hafizy (Hafizy, 2017) mentions that strict regulations on registration prevent many Indonesian expatriates from exercising their voting rights. To overcome this problem, the Indonesian government has relaxed restrictions on registration, resulting in a relatively high number, 335,679, of newly registered voters (Kelompok Kerja Pembina Pemilihan Umum Luar Negeri, 2019).

On the other hand, a growing body of research on external voting mostly focuses on developed countries with long-established democracy, such as (Cain et al., 2008; Hanmer et al., 2015; Herrnson et al., 2015; Murray, 2012; Smith, 2010), Italy (Battiston & Mascitelli, 2008), and Portugal (Belchior et al., 2018). The United States has advanced the voting method by using electronic media such as fax, email, or the internet (Cain et al., 2008; Hanmer et al., 2015). On the other hand, Italy (Battiston & Mascitelli, 2008) and Portugal (Belchior et al., 2018) provide political representation for their expatriates. However, both of these aspects rarely exist in developing democracies.

Furthermore, studies on the implementation of out-of-country voting in developing countries are still limited. Among them are Alarcon Jr (Alarcon Jr, 2012) and (Kaario, 2018) who explored overseas voting in the Philippines, Low (Low, 2018), who explored overseas voting in Malaysia; and Şahin-Mencütek & Erdoğan (Şahin-Mencütek & Erdoğan, 2016) and Sevi et al. (Sevi et al., 2020), who studied Turkey's external voting. Unlike Indonesia, these countries do not have long experience in implementing voting from abroad. They began adopting voting from abroad in the 2000s, long after Indonesia began implementing it in 1971 (Pamungkas et al., 2019). Malaysia (Low, 2018) implemented external voting in 2003, the Philippines in 2004, Turkey in 2014, and Lebanon in 2018 (Sevi et al., 2020).

c. The Case of Indonesia

The complexity and challenges can be seen in the administration of the 2019 external voting by the Indonesian government. Indonesia, which has had the provision of external voting since 1953 (Ellis et al., 2007), started the implementation in its second election in 1971 (Pamungkas et al., 2019). As a country with long experience in the implementation of external voting, Indonesia and its government facilitates more than 2 million overseas voters with hundreds of external poll stations, thousands of human resources, and billions of rupiahs to administer the voting at 130 diplomatic stations in 96 countries (Kelompok Kerja Pembina Pemilihan Umum Luar Negeri, 2019). The 130 polling stations are supported by 556 Overseas Election Committee (PPLN), 1,200 Voter Data Updating Committee (Pantarlih), and 12,765 Overseas Voting Organizing Group (KPPSLN) employed for the 2019 election (Kelompok Kerja Pembina Pemilihan Umum Luar Negeri, 2019). They come from various backgrounds of the Indonesian diaspora and, as Ellis et al. (Ellis et al., 2007) mentioned, were temporarily employed.

To increase the participation of overseas citizens in elections, the government also provides numerous facilities for the three voting methods implemented. As many as 783 polling stations were prepared for direct voters, 2,345 ballot boxes for remoted voters, and 429 postal voting units for absentee voters (Kelompok Kerja Pembina Pemilihan Umum Luar Negeri, 2019). It is interesting that Indonesia specifically uses the mobile ballot box voting method in which the voting organizer comes to a group of emigrants who live in remote areas, cannot go to polling stations, or do not have access to postal services.

In addition, the government has established more flexible regulations on voter registration. The regulation accommodates traveling voters who have been registered as voters at one polling station, but they move/travel to another country to re-register themselves to vote at the nearest polling station at the new host country. These include the list of additional permanent voters (DPTb), and expatriate citizens who have not been registered as voters during the registration period who is included in the list of specific voters (DPK). Data from Pokja PLN (2019) shows that the relaxation of this registration regulation increased the number of overseas voters, which consisted of 9,727 traveled voters (DPTb) and 325,952 new voters (DPK) (Kelompok Kerja Pembina Pemilihan Umum Luar Negeri, 2019).

Thus, this study attempts to fill in the gap by examining the implementation of external voting in developing countries. Particular attention is given to the operations of overseas polling stations by conducting a case study of the 2019 election held by the Indonesian government and observing the real implementation of external voting and voter participation through a survey at the Tokyo polling station.

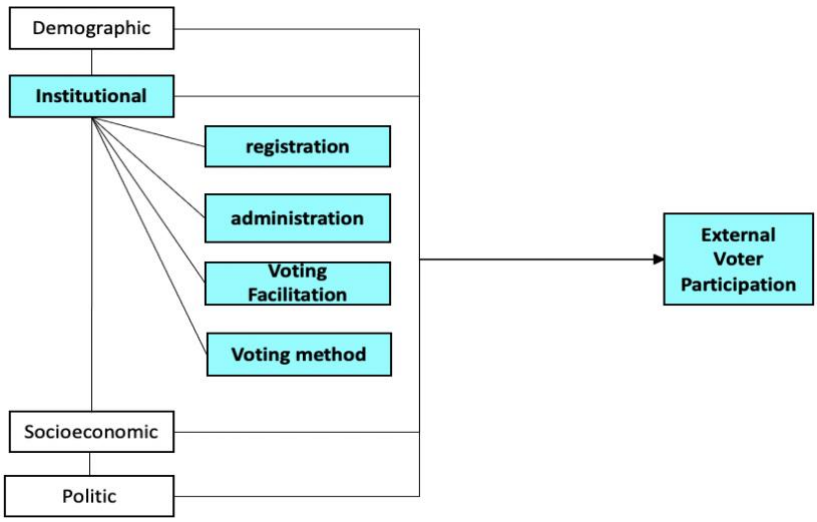


Figure 1. Institutional Factors diagram for External Voter Participation

The influential factors on voters' participation can be seen in Figure 1. This study will focus on institutional factors, significant factors of voter participation. Registration, which is one of the institutional factors affecting voter participation (Lafleur & Chelius, 2011), will be used in this study. Registration is the initial part of the voting process, which determines the number of registered voters who can exercise their voting rights. The second institutional factor to be used is voting administration, where the implementation of voting abroad is complex (Ellis et al., 2007; Hafizy, 2017). Furthermore, voting facilitation, which is an important factor in voting (Bauböck, 2007) will be an important object of the study considering that Indonesia has provided a polling station and voting committee in 130 embassies or consulates. Finally, the voting method would also affect the level of voter participation, as suggested by Belchior et al., (2018).

2. Methodology

This study employed qualitative approaches to examine the research questions using both primary and secondary data. Primary data was collected through an online survey given to Indonesian citizens living in the Kanto and nearby areas. A simple online questionnaire using Google forms was distributed to respondents. It was sent through email and social media, Instagram, and WhatsApp, starting from June 18, 2020, and ending on June 30, 2020. The online questionnaire was sent to 299 email addresses of Indonesian residents in Chiba, Saitama, Kanagawa, and Tokyo and several Instagram and WhatsApp accounts. The questionnaire consisted of 18 questions, 15 close-ended and three open-ended. See Appendix for the list of questions.

A total of 65 respondents, 28 men, and 37 women have a higher education. The focus of research on respondents with higher education is based on the rapid development of higher education in Indonesia (Pratomo et al., 2020). According to law No. 12 of 2012, “higher education is the education level after secondary education including diploma, undergraduate, master, doctoral, professional, and specialist programs, which are organized by universities based on Indonesian culture.” The participants were selected to observe the behavior of white-collar citizens toward Indonesia’s election.

Secondary data was primarily obtained from Advisory Working Groups for Overseas Elections (Kelompok Kerja Pembina Pemilihan Umum Luar Negeri, 2019), Overseas Election Committee (PPLN), National Election Commission (KPU), and Ministry of Foreign Affairs. Officials from each of the institutions as mentioned above were contacted to obtain access to records and documents on external voting and overseas citizens.

Descriptive analysis was utilized to provide an overview of the 2019 external voting implementation using quantitative data (at the aggregate level unit analysis per polling station) and relevant sources such as academic papers, government reports, and publications. In the qualitative approach, an online survey was administered to Indonesian citizens living in the Kanto and nearby areas, Japan, related to their experiences, perceptions, and participation in the 2019 election.

The first part of the analysis in this paper explores the implementation of external voting by the Indonesian government and overseas voters. This analysis uses relevant sources such as academic papers, government reports or publications, and macro data (per polling stations unit analysis) related to the 2019 external voting from Pokja PLN and National Election Commission. The second part of the analysis explores the findings from the survey given to Indonesian citizens living in the Kanto and nearby areas. The survey results present the real condition of external voting at the micro-level. The analysis of this paper focuses on institutional factors such as registration, administration, voting facilitation, voting methods, and how respondents' experiences of institutional factors influence their political behavior.

3. Results and Discussion

3.1 The 2019 External Voting

The 2019 election was the 12th general election carried out by the Indonesian government. Therefore, to improve the quality of election execution, the government introduced many policy changes. Some policy changes were related to the administration of elections, for example, the simultaneous election of presidential and parliamentary elections, the reduction of the number of voters per polling station from 500 to 300 voters per polling station, thereby increasing the number of polling stations by almost 50% from the previous election in 2014 (Badan Pusat Statistik, 2019, p. 25), and adjusting the number of Overseas Election Committee members based on the number of voters (Election Commission Regulation Number 4, 2018).

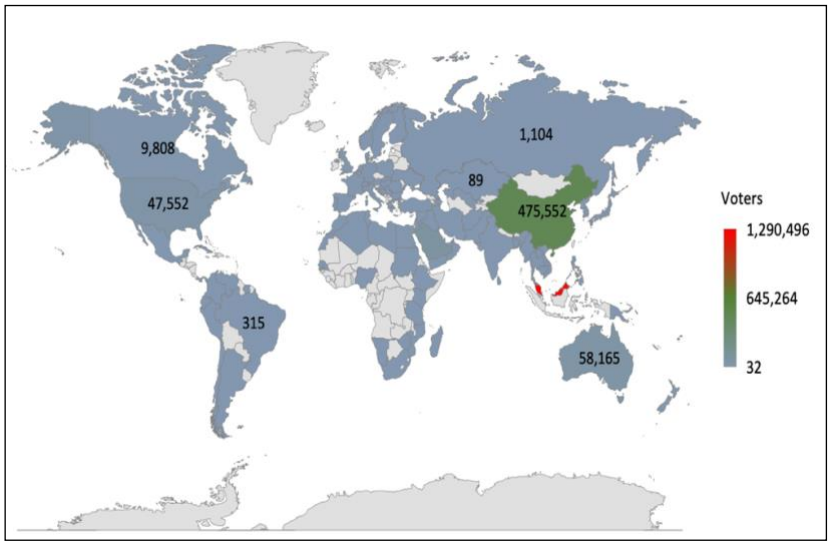


Figure 2. Overseas Voters Distribution (Compiled by the author based on data from the National Election Commission)

As Indonesia started the external voting in the second election, the 2019 election was the 11th external voting. Data from Kelompok Kerja Pembina Pemilihan Umum Luar Negeri (Kelompok Kerja Pembina Pemilihan Umum Luar Negeri, 2019) revealed that the total number of registered overseas voters in DPT (Permanent Voter List) in this period was 1,991,145 voters covering 96 countries with the highest number of voters from Malaysia, followed by China and Singapore. This number was only about 1% of the total number of voters, which reached 192,770,661 voters spread across 34 provinces and overseas. However, the number of overseas voters exceeded the number of voters in some provinces in Indonesia (Badan Pusat Statistik, 2019). This is most likely due to the unequal distribution of the population in Indonesia and a large number of Indonesian citizens abroad. Voters distribution map can be seen in Figure 2.

The comparison of the number of overseas voters and the number of Indonesian citizens abroad based on relevant sources shows a significant difference. Even though each of the relevant sources presents a different number of Indonesian emigrants, these figures are still far more than the number of overseas voters in the 2019 elections. For instance, Muhidin & Utomo (2016) revealed that data from 4 different sources showed a significant difference in the number of Indonesian citizens abroad in 2013. This number ranges from 2.9 million - 6 million citizens. Meanwhile, the latest migrant data from the UN

Migrant Stock, the most widely used data source, shows that the number of Indonesian citizens abroad in 2019 was 4,532,992 people. Data on the age of all emigrants in each country from the UN Migrant Stock were used to obtain the number of voting age populations of emigrants. It was found that the proxy for Indonesian emigrants aged 17 and over was 3,868,213, a figure that is almost double the number of overseas voters in the 2019 DPT.

Indonesia has a long experience in implementing external voting. Provisions on political rights for Indonesian citizens abroad began to be regulated in 1953 through election law number 7 of 1953 (Ellis et al., 2007). However, its implementation was only carried out in 1971 (second general election) during the new order period (Pamungkas et al., 2019). In the election, overseas voters were allowed to vote for parliamentary members in the House of Representative (DPR) during the 1971–2019 elections and Presidential candidates during the 2004–2019 elections. However, from the first election in 1955 until the 2019 election, there has been no direct representation of overseas voters in the parliament. The overseas voters vote for Jakarta's two constituencies, which consist of South Jakarta, Central Jakarta, and overseas. In its implementation, the government consistently forms Overseas Election Committee (PPLN) and prepares polling stations at the Indonesian embassies and consulate offices.

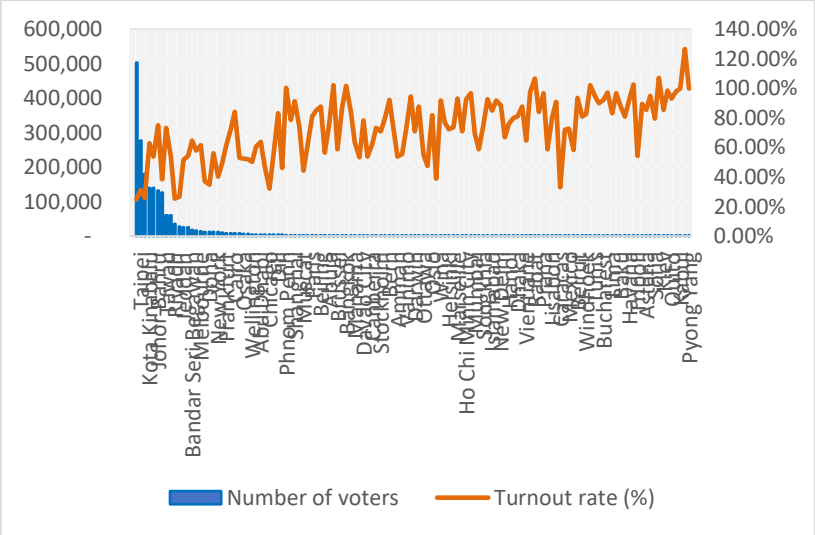


Figure 3. Overseas Voters and Turnout Rates by Polling Stations (Compiled by the author based on data from the National Election Commission)

Overseas citizen participation in the 2019 election is lower than domestic citizens. Of the 1,991,145 overseas voters registered in the list of permanent voters (DPT), 847,037 voters successfully cast their ballot resulting in a 42.54 % participation rate for the presidential election (Kelompok Kerja Pembina Pemilihan Umum Luar Negeri, 2019). This rate is about half of the participation rate in the home country, which reached 82.38% and the lowest compared to the participation rate in each of the 34 provinces in Indonesia (Badan Pusat Statistik, 2019). Overseas voter participation also varied at each polling station; data from Pokja PLN shows that the participation ranges between 24.92%–126.67%. The participation rate that exceeded 100% was due to additional voters other than the permanent voters on DPT who cast a ballot, namely traveled voters on DPTb and new voters on DPK. The turnout variation can be seen in Figure 3.

Election Commission Regulation Number 12 (2018) categorized three types of overseas voter lists based on their registration:

- DPT LN (*Daftar Pemilih Tetap Luar Negeri* - List of permanent overseas voters) consists of the overseas voter list from the previous election and overseas citizens listed in the consular database at the Indonesian Embassy/Consulate, which the committees used to synchronize, compile and update the permanent voter list.
- DPTb LN (*Daftar Pemilih Tetap Tambahan Luar Negeri* - List of additional permanent overseas voters) consists of voters who have listed in the DPT of a polling station who, because of a certain condition, such as residence change due to assignment or relocation, cannot use their voting rights

at the polling station where they are registered. These voters can request a move to vote at the nearest polling station.

– DPK LN (*Daftar Pemilih Khusus Luar Negeri* - List of specific overseas voters) consists of voters who have not registered in the permanent voter list (DPT) but then register themselves to vote using passports or other travel documents proving that they are living abroad.

Voters on the list of permanent overseas voters (DPT LN) can be assumed as automatically registered voters because they are automatically listed as voters on the DPT LN. On the other hand, voters on the list of additional permanent overseas voters (DPTb LN) and the list of specific overseas voters (DPK LN) can be assumed as self-registered voters because they need to register themselves to vote.

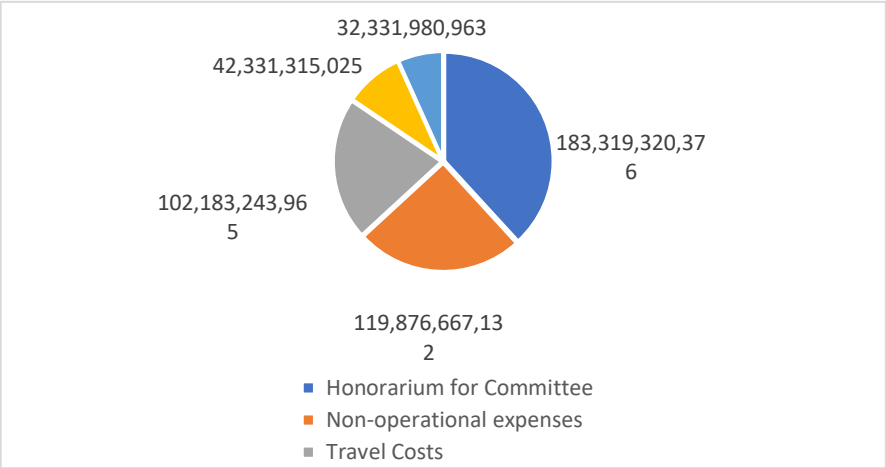


Figure 4. Total Expenses at 130 Polling Stations (Compiled by the author based on data from the National Election Commission)

The implementation of overseas voting involves the government's significant role. One of them is related to budget allocation. In the 2019 external voting, the government allocated a sizable budget to 130 polling stations which reached more than 621 billion rupiahs (equal to US$ 41 million) (Kelompok Kerja Pembina Pemilihan Umum Luar Negeri, 2019). This fund was used to support various activities at the overseas polling station, which included the committee's honorarium (38.19%), expense related to information dissemination about elections and meetings, non-operational expenses (24.97%), travel cost (21.29%), logistics expenditure (8.82%), and rental expenditure 6.74%). Of the total allocated funds, around 77% was spent on 130 overseas polling stations for the 2019 external voting. The proportion of the expenses can be seen in Figure 4.

Additionally, the government formed four ad hoc committees consisting of the Overseas Election Committee (PPLN), Overseas Voting Organizing Group (KPPSLN), Voter Data Updating Committee (Pantarlih), and Overseas Election Supervisory Committee (Panwaslu).

There were three methods of voting for overseas voters. Unlike domestic voters, overseas voters can use one of the three voting methods provided. First is direct voting at polling stations; the second is absentee voting through the postal service for voters who cannot go to the polling stations; and the last is voting through a ballot box which is provided for a group of voters who gather, work, or live in one area. In the 2019 elections, the government provided 789 polling stations, 2,354 ballot boxes, and 438 postal service units to 130 locations in 96 countries (Kelompok Kerja Pembina Pemilihan Umum Luar Negeri, 2019).

The implementation of democracy in Indonesia has experienced significant improvement since the first elections in 1955. This shows the government's commitment to implement democracy in Indonesia which is apparent from the implementation of external voting from the second election in 1971 to the current election in 2019. The government consistently supports the implementation of voting abroad, such as regulations, funds, and human resources.

3.2 Highly Educated Voters in Tokyo Polling Station

In addition to the Osaka polling station, the Tokyo polling station is one of the two polling stations in Japan provided by the government for the 2019 external poll. Each polling station serves voters who live close to the polling station. The Tokyo polling station serves Indonesians living in 30 prefectures close to Tokyo, such as Hokkaido, Aomori, Iwate, Akita, Miyagi, Yamagata, Fukushima, Gunma, Ibaraki, Tochigi, Saitama, Chiba, Tokyo, Kanagawa, Niigata, Toyama, Ishikawa, Nagano, Gifu, Yamanashi, Shizuoka, Aichi, Fukuoka, Saga, Nagasaki, Oita, Kumamoto, Miyazaki, Kagoshima, and Okinawa (PPLN Tokyo, 2019a). The Tokyo polling station is located at Balai Indonesia, the Republic of Indonesia School at 4 Chome-6-6 Meguro, Meguro City, Tokyo 153-0063, two kilometers from the Indonesian Embassy.

Three online accounts were used to disseminate information about overseas voting in Tokyo. The first is the Tokyo PPLN Facebook account with 5,864 followers. This media is quite active and comprehensive in conveying information about voting in Tokyo. The second is the https://ppln2019.tokyo page which is linked to the Tokyo PPLN Facebook account, but at the time of this study, the page was no longer accessible. The last is the official website of the Indonesian Embassy in Tokyo https://kbritokyo.jp. As this page is not specifically made for the election, it does not contain much information about voting in Tokyo.

The government provided some assistance for the 2019 external voting in Tokyo. These supports include fund allocation of around IDR 4 billion (equivalent to the US $ 300,000), ad hoc committee formation, consisting of 10 Overseas Election Committee (PPLN) and 31 overseas voting organizer group (KPPSLN), 7 for voting at the polling station and 24 for voting by post, and 130 overseas polling stations (Kelompok Kerja Pembina Pemilihan Umum Luar Negeri, (Kelompok Kerja Pembina Pemilihan Umum Luar Negeri, 2019).

Two voting methods were used to serve 16,799 registered voters on the permanent voter list (DPT). The first was direct voting at the polling station, which was allocated for 1,182 voters (only 7.04 %). The second was absentee voting by post, which was allocated for the majority of the voters (92.96 %) 15,617 voters. The voting by ballot box method was not provided at the Tokyo polling station. There was a total of eight postal service groups provided to serve voting by post. However, only five voting booths were provided at the polling station (Oktaviane, 2019) to serve direct voting at the polling station.

However, the actual number of voters who came to the polling station doubled the DPT voters registered to vote at the polling station. Data from the Advisory Working Groups for Overseas Elections in (2019) recorded that there were 1,293 additional voters. About 657 voters were transferred from other polling stations, w categorized as additional voters on DPTb, and 636 were new voters who registered on the voting day, categorized as specific voters on DPK. This considerable increase in the number of voters who came on voting day, which was not anticipated, caused overcrowding of queueing voters and overload work for the committee.

Indonesian citizen participation in the 2019 External voting in Tokyo was below the average participation rate of the 130 overseas polling stations. The 2019 external voting at the Tokyo polling station on Sunday, April 14, 2019, from 08:00 to 22:42 recorded 1,937 voters out of 2,222 voters (Indonesian Embassy in Tokyo, 2019). However, the total participation rate according to data from Kelompok Kerja Pembina Pemilihan Umum Luar Negeri (Kelompok Kerja Pembina Pemilihan Umum Luar Negeri, 2019) was only 57.82%. It implies that from the 16,799 registered voters on the permanent voter list (DPT), only 9,713 voters successfully cast ballots. This participation rate was below the average participation rate of 130 overseas polling stations, which was 72.84%. The voting resulted in Joko Widodo–Mar'ruf Amin victory by 61.31% votes over Prabowo Subianto–Sandiaga Uno who collected 36.38% votes.

3.3 Discriminative Analysis of Respondents

Respondents of the survey come from six prefectures in the Kanto area: Tokyo, Saitama, Kanagawa, Chiba, Shizouka, and Ibaraki. These prefectures are closer to Tokyo polling stations than the Osaka polling station. They consist of almost an equal number of men and women, with 43% male respondents and 57% female and the average age being 29 years old. About 51% of respondents had an age range of 21–30 years, and 37% of respondents had an age range of 31–40 years. The discriminative data of respondents can be seen in Table 1.

Table 1: Discriminative list of respondents

Characteristics	17-20			21-30			31-40			41-50			51-60		Grand Total
	F	M	Tot	F	M	Total	F	M	Total	F	M	Total	M	Total	
Occupation															
Student	2		2	11	10	21	4	3	7		1	1		-	**31**
Govt. Official			-	2	1	3	6	3	9			-		-	**12**
Specialist			-	1	2	3	3		3			-	1	1	**7**
Private		1	1	3	3	6	2	1	3	1	2	3		-	**13**
Housewife			-			-	2		2			-		-	**2**
	2	1	3	17	16	33	17	7	24	1	3	4	1	1	**65**
Education															
Undergraduate/ Graduate	2	1	3	16	14	30	16	6	22	1	2	3	1	1	**59**
Doctoral			-	1	2	3	1	1	2		1	1		-	**6**
	2	1	3	17	16	33	17	7	24	1	3	4	1	1	**65**
Length of stay															
> 0 - 3 years	2	1	3	9	12	21	11	5	6		2	2	1	1	**43**
> 3 - 5 years			-	4	4	8			-		1	1		-	**9**
> 5 - 9 years			-	2		2	3	2	5			-		-	**7**
> 9 years			-	2		2	3		3	1		1		-	**6**
	2	1	3	17	16	33	17	7	24	1	3	4	1	1	**65**

The respondents were highly educated citizens, most of whom had a bachelor's or master's degree, and about 9% had a doctorate degree. The respondents' occupation was mostly students (48%) followed by professionals in the private sector (20%), government employees (18%), specialists (11%), and housewives (3%). It is assumed that students tend to check their emails more often than other professions to give the most responses. More than half of the respondents were short-term residents in Japan, while about 66% of respondents had stayed in Japan between > 0–3 years. This is consistent with the students' durational stay with a study period of 1–3 years

3.4 Registration Condition

According to the survey, the majority of respondents were self-registered voters. About 75% of respondents registered themselves as voters, while the remaining 22% stated they were automatically registered. Most respondents who registered themselves claimed to have lived in Japan for up to three years were aged 21–30 years old and were female. On the other hand, the automatically registered respondents had a long span of stay in Japan that was spread evenly between >0–3 years old to >9 years old; most were aged 31–40 years old and were female.

Nevertheless, among the self-registered respondents, six respondents stated that the existing registration procedure was complex or very difficult. These are self-registered voters who had lived in Japan for a short period and up to three years. Even though they are all university graduates, a short stay might contribute to the difficulties encountered in registration. The voters must register themselves due to the absence of relevant data in the election committee database. They also faced difficulty registering due to a lack of information about the election.

3.5 Four Types of Problems in the Voting Process

The results of the questionnaire showed that 25 respondents (about 38%) encountered problems/difficulties regarding the voting process. These respondents reported 39 problems in polling facilitation (13 complaints) followed by registration (10 complaints), voting method (8 complaints), and administration (8 complaints) used in the 2019 external voting.

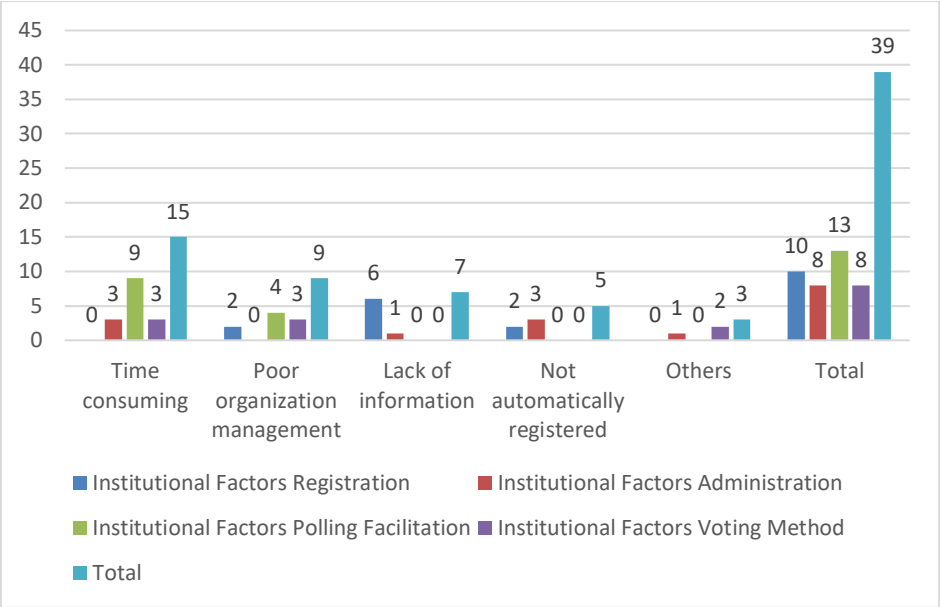


Figure 5: Type of problems faced by respondents

Problems reported by respondents can be categorized into four categories. Ordered in sequence from the most frequently complained, the four problems are as follows: 1) Time consumed in the voting process (15 complaints); 2) Poor organizational management (9 complaints), 3) Lack of information about elections (7 complaints), and 4) Citizens who were not automatically registered as voters (5 complaints). The number of complaints about each category can be seen in Figure 5.

a) Time-consuming voting process

The length of time required in the voting process is the most complained problem. Approximately 38% of such complaints, or 15 cases, were reported in the survey. 13 voters reported this time concern on three aspects: administration, facilitation of voting, and the voting method. However, two more voters stated that they faced this problem in two aspects simultaneously: administration and voting facilitation, resulting in 15 time-related problems. The respondents stated that they had to wait in a long queue to vote and the election was poorly organized, causing overcrowding and confusion.

The time-related complaints were expressed by voters with a duration of stay in Japan of up to 3 years and had registered themselves as voters with the committee. It implies that these respondents are most likely not included in the overseas permanent voter list (DPT LN). They are included as additional voters who had moved to vote from another polling station (DPTb LN) or new voters who had registered themselves with the committee (DPK LN). Two of the 12 respondents who complained about the voting time were confirmed as voters in the DPTb (1 respondent) and voters in the DPK (1 respondent). This is similar to Oktaviane's (Oktaviane, 2019) study, which found hundreds of DPK voters had to queue for hours to cast their ballots for the 2019 vote in Tokyo.

Voters included on specific lists of overseas voters (DPK) at the Tokyo polling station must follow a number of procedures that require extra time to vote. (PPLN Tokyo, 2019b) revealed that these voters must follow three steps. First, they had to register with the committee, which could only be done since the polling station started operating at 09:00. Second, after registration, they were required to take a queue number between 16:00 and 18:00. Third, they started casting ballots at 17:00 based on the queue numbers and the availability of ballot papers. These new voters were only allowed to vote one hour before the voting ended or had to wait for voters on the permanent voter list (DPT) and additional list (DPTb) to finish their casting ballots. A large number of new voters on specific voter lists (DPK) extended the queue of voters and the length of time for voting.

b) Poor organization and management

The second most frequent problem faced by respondents was the poor management of the voting organization. A total of eight respondents raised nine problems related to the management of the voting organization. This complaint was conveyed not only by six respondents of the self-registered voters (DPK and DPTb) but also by two respondents of the automatically registered voters (DPT). Four respondents in voting facilitation reported this problem.

Of the nine issues related to organizational management, three respondents mentioned the lack of committee members on duty compared to the large number of voters who came to the polling station. This condition is in line with data from Kelompok Kerja Pembina Pemilihan Umum Luar Negeri (Kelompok Kerja Pembina Pemilihan Umum Luar Negeri, 2019), that the number of committee personnel assigned to organize voting at the polling station was only seven persons. This number was inadequate compared to the number of voters who came to the polling station, which reached more than 2,000 (Indonesian Embassy in Tokyo, 2019).

Another problem raised was the lack of polling booths provided for voters. Two respondents reported this problem. The committee only provided five voting booths in the 2019 election at the Tokyo polling station (Oktaviane, 2019). This figure was only half those provided in the previous election in 2014 (Indonesian Embassy in Tokyo, 2014). For comparison, the 2014 voting only served 9,092 DPT voters, only about half of the registered voters in the 2019 DPT with 16,799 voters.

The number of voting booths provided was insufficient compared to the number of voters. According to the government regulations on Election Commission Regulation Number 4/2018, each polling station serves a maximum of 300 voters. While in the 2019 external voting in Tokyo, one polling station with only five polling booths served more than 2,000 voters. This condition caused long queues of voters at polling stations and potentially resulted in many voters unable to cast their votes.

c) Lack of information about voting

The third problem raised by respondents was the lack of information received about voting. Six respondents reported a total of seven complaints with almost all problems concerning registration. Similar to the complaints about the time consumed, this complaint was also delivered by self-registered voters with a stay in Japan of up to 3 years. Surprisingly, one respondent with a stay of 5 to 9 years also submitted the same complaint.

The results from the questionnaire showed that the limited media used to broadcast the information and the less informative content caused the lack of information received about voting. For example, one respondent revealed that information about voting was less spread on other channels and media outside the Indonesian Embassy website. On the other hand, other respondents stated that information on the website of the Indonesian Embassy was unclear. Furthermore, other respondents more specifically stated that the registration period was not well informed.

d) Not automatically registered as a voter

The fourth problem addressed by the respondents is that the respondents were not automatically registered as voters. This was reported in five cases by five respondents who were self-registered voters with the length of stay in Japan of up to three years.

The survey results indicate that the database of Indonesian citizens at the Indonesian Embassy was not used properly by the committee to update the voter data. This caused Indonesian citizens who had reported themselves to the Indonesian Embassy to be excluded as automatically registered voters on the DPT so that they had to register themselves to vote. This was confirmed by one respondent who had reported himself to the Indonesian Embassy long in advance, but his data was not included on the voter list (DPT).

e) Other problems

Finally, two other problems were reported by two respondents, indicating their pessimistic attitude toward the existing voting system. The response suggested the importance of overseas citizen data integration in compiling voter lists to cover all overseas citizens. Another response highlighted the possibility of using an online voting system to overcome the problems at polling stations.

3.6 Respondents Who Did Not Vote

Out of 65 respondents, nine respondents did not use their voting rights. Almost half of them, four respondents, revealed that the reason for not voting was that they encountered problems/difficulties in the voting process, while other (five respondents) stated that they were busy working. These four respondents mostly complained about the length of time needed in the voting process due to long and irregular queues, poor organizational management, and the lack of personnel on duty and polling booths compared to the number of voters. The lack of information received related to voting was mentioned less frequently.

Conclusion

The Indonesian external voting has gone through a long history and has been in line with the country's democracy. The government has consistently provided substantial support when conducting voting from outside its territory. Significant funds and human resources were allocated to hold external voting. However, a lack of facilities for 2019 external voting was still observed. The number of voting booths and committee personnel failed to accommodate the excess voters at the Tokyo polling station.

Even though highly educated respondents tended to have a high awareness of home country elections, they are prone to fail in casting their ballots due to the length of time needed, poor organizational management of the voting, and lack of information received about voting. On the other hand, the survey results reveal that registration restrictions did discourage their participation, which is evident from the significant enthusiasm of respondents to register themselves as voters.

It is suggested that the committee consider expanding the channels and media used to disseminate information about elections so that overseas citizens can obtain sufficient information to avoid problems in the voting process. They may also assess the possibility of using more effective voting methods such as online voting.

Acknowledgments

I would like to thank the University of Indonesia, the National Graduate Institute for Policy Studies Japan, Bappenas, the Ministry of Foreign Affairs, Kelompok Kerja Pembina Pemilihan Umum Luar Negeri, my family and colleagues for the opportunity, guidance, and support during the writing of this research paper.

References

Alarcon Jr, J. (2012). Diaspora and Democracy: Overseas Absentee Voting, Elections, and the Challenges for a Working Democracy in the Philippines. 立命館言語文化研究, *13*(3), 183–200.

Badan Pusat Statistik. (2019). *Statistik Politik 2019*.

Battiston, S., & Mascitelli, B. (2008). The challenges to democracy and citizenship surrounding the vote to Italians overseas. *Modern Italy*, *13*(3), 261–280. https://doi.org/10.1080/13532940802069572

Bauböck, R. (2007). Stakeholder citizenship and transnational political participation: A normative evaluation of external voting. *Fordham L. Rev.*, *75*, 2393.

Belchior, A. M., Azevedo, J., Lisi, M., & Abrantes, M. (2018). Contextual reasons for emigrants' electoral participation in home country elections: The Portuguese case. *Journal of Contemporary European Studies*, *26*(2), 197–214. https://doi.org/10.1080/14782804.2017.1413641

Blais, A., Daoust, J. F., Dassonneville, R., & Péloquin-Skulski, G. (2019). What is the cost of voting? *Electoral Studies*, *59*(February), 145–157. https://doi.org/10.1016/j.electstud.2019.02.011

Burgess, K., & Tyburski, M. D. (2020). When parties go abroad: Explaining patterns of extraterritorial voting. *Electoral Studies*, *66*(May). https://doi.org/10.1016/j.electstud.2020.102169

Cain, B. E., Mac Donald, K., & Murakami, M. H. (2008). Administering the overseas vote. *Public Administration Review*, *68*(5), 802–813. https://doi.org/10.1111/j.1540-6210.2008.00921.x

Ciornei, I., & Østergaard-Nielsen, E. (2020). Transnational turnout. Determinants of emigrant voting in home country elections. *Political Geography*, *78*(December 2018). https://doi.org/10.1016/j.polgeo.2020.102145

Collyer, M. (2014). A geography of extra-territorial citizenship: Explanations of external voting †. *Migration Studies*, *2*(1), 55–72. https://doi.org/10.1093/migration/mns008

Department of Economic and Social Affairs United Nations. (2020). *International migrant stock 2019*. Un.Org.https://www.un.org/en/development/desa/population/migration/data/estimates2/estimates19.asp

Ellis, A., Navarro, C., Moralles, I., & Wall, A. (2007). *Voting From Abroad Database*. International Idea.

Hafizy, W. (2017). Penjaminan Hak Pilih Warga Negara di Luar Negeri: Kajian Instrumentasi Pemilu. In *Gadjah Mada University*. Gadjah Mada University.

Hanmer, M., Herrnson, P. S., & Smith, C. (2015). The Impact of E-mail on the Use of New Convenience Voting Methods and Turnout by Overseas Voters: A Field Experiment to Address Their Challenges with New Technology. *Election Law Journal: Rules, Politics, and Policy*, *14*(2), 97–110. https://doi.org/10.1089/elj.2014.0266

Herrnson, P. S., Koh, H. Y., Hanmer, M. J., & Smith, C. (2015). Message, milieu, technology, and turnout among military and overseas voters. *Electoral Studies*, *39*, 142–152. https://doi.org/10.1016/j.electstud.2015.04.002

Indonesian Embassy in Tokyo, I. and S. C. F. (2014). *Gerimis dan Dingin Bukan Hambatan Bagi WNI di Tokyo*. Kbritokyo.Jp. https://kbritokyo.jp/2014/12/gerimis-dan-dingin-bukan-hambatan-bagi-wni-di-tokyo-untuk-datangi-tps/

Indonesian Embassy in Tokyo, I. and S. C. F. (2019). *Pelaksanaan Pemilu 2019 di Tokyo*. Kbritokyo.Jp. https://kbritokyo.jp/2019/04/pelaksanaan-pemilu-2019-di-tokyo/

Kaario, M. I. (2018). *Communicating Overseas Absentee Voting (OAV) to Filipinos in Finland: A transnational communication perspective*. Haagia-Helia University of Applied Sciences.

Kelompok Kerja Pembina Pemilihan Umum Luar Negeri. (2019). *Laporan Kelompok Kerja Pembina Pemilihan Umum Luar Negeri Tahun 2019*.

Lafleur, J. M., & Chelius, L. C. (2011). Assessing Emigrant Participation in Home Country Elections: The Case of Mexico's 2006 Presidential Election. *International Migration*, *49*(3), 99–124. https://doi.org/10.1111/j.1468-2435.2010.00682.x

Low, C. C. (2018). MyOverseasVote: Liberalism and extraterritorial citizenship. *Citizenship Studies*, *22*(7), 745–768. https://doi.org/10.1080/13621025.2018.1508416

Muhidin, S., & Utomo, A. (2016). Global Indonesian Diaspora: How many are there and where are they? *JAS (Journal of ASEAN Studies)*, *3*(2), 93. https://doi.org/10.21512/jas.v3i2.847

Murray, J. (2012). Absent voting, the Help America Vote Act 2002, and the American overseas voter: An analysis of policy effectiveness and political participation. In *Newcastle University* (Issue November).

Oktaviane, D. (2019). *Pemilu 2019, WNI di Tokyo Rela Antre Berjam-jam*. Tempo.Co.Id. https://video.tempo.co/read/14282/pemilu-2019-wni-di-tokyo-rela-antre-berjam-jam

Pamungkas, M., Cholik, A., Sari, D. M., Yusnita, E., Rahman, H. A., Situmorang, N., Sunjaya, S., Fatimah, S., Suharti, & Sugiyanto, W. (2019). Jejak Demokrasi Pemilu 1955. In *Arsip Nasional Republik Indonesia*.

PPLN Tokyo. (2019a). *Our Story*. Facebook.Com. https://www.facebook.com/Pemilu2019Jepang/

PPLN Tokyo. (2019b). *TOLONG DI BACA DENGAN SEKSAMA*. Facebook.Com. https://www.facebook.com/Pemilu2019Jepang/

Pratomo, D. S., Syafitri, W., & Anindya, C. S. (2020). Expanding Middle Class in Indonesia. *The Journal of Indonesia Sustainable Development Planning*, *1*(3), 307–312. https://doi.org/10.46456/jisdep.v1i3.103.

Şahin-Mencütek, Z., & Erdoğan, M. M. (2016). The Implementation of Voting from Abroad: Evidence from the 2014 Turkish Presidential Election. *International Migration*, *54*(3), 173–186. https://doi.org/10.1111/imig.12229

Sevi, S., Mekik, C. S., Blais, A., & Çakır, S. (2020). How do Turks abroad vote? *Turkish Studies*, *21*(2), 208–230. https://doi.org/10.1080/14683849.2019.1607311

Smith, C. (2010). These are our Numbers: Civilian Americans Overseas and Voter Turnout. *OVF Research Newsletter*, *2*(4), 1–13.

Vol. 2 No. 1- April 2021

E-ISSN: 2722-0842 | P-ISSN: 2721-8309

Available online at
http://journal.pusbindiklatren.bappenas.go.id/

Research Paper

Trends and Situation of Forest Fire in Indonesia 2015-2018, Based on Three Factors: Peatland, Timber Concession, and Forest Area

Mila Soraya

Master of Economic Planning and Development Policy, Faculty of Economics and Business University of Indonesia, Depok, Indonesia
milasoray@gmail.com

ABSTRACT

This research addresses the reoccurrence of forest fires and their size with regional-spatial information. This study is attained to the Sustainable Development Goal in the year 2030 (climate action and life on land) and is consistent with the mission of JISDeP. Probit and tobit regression analyses were applied to the regional-spatial panel data from 2015 to 2018 in Indonesia with the observations of forest-fire events, peatland, forest area, and timber concession on an annual basis. Such analyses would characterize the possible determinants for the forest fire reoccurrence together with their sizes. Comparatively, this study tries to fill the gap by examining the reoccurrence of forest fires. This research tries to fill in the gap on studies about land and forest fires by combining quantitative analysis using probit and tobit regression and using spatial approach of peatland, forest and timber concession area. The regression results reveal the following outcomes. The first outcome is whether forest fire reoccurrence positively (negatively) associated with peatland and forest areas (timber concession). Second, forest fires tend to decrease with the repetition of past forest fires but increase with timber concession, peatland, and forest areas. Overall, these results imply that the reoccurrence of forest fires and their sizes is highly concerned with timber concession and types of areas, suggesting that Indonesia should organize the policies regarding forest timber concession and areas to reduce forest fires and the associated damage.

Keywords: *forest fire reoccurrence, peatland, timber concession, forest area*

ARTICLE INFO

Received: November 01,2020
Received in revised form: March 16, 2021
Accepted: April 01, 2021

doi: 10.46456/jisdep.v2i1.89

JISDeP - The Journal of Indonesia Sustainable Development Planning
Published by Centre for Planners' Development, Education, and Training (Pusbindiklatren), Ministry of National Development Planning/ National Development Planning Agency (Bappenas), Republic of Indonesia

Address: Jalan Proklamasi 70, Central Jakarta, Indonesia 10320
Phone: +62 21 31928280/31928285
Fax: +62 21 31928281
E-mail: journal.pusbindiklatren@bappenas.go.id

Supported by Indonesian Development Planners Association (PPPI)

1. Introduction

The World Bank estimates that, in 2015, forest fires cost Indonesia at least USD 16.1 billion (IDR 221 trillion) with a size of 2.6 million hectares. It is about four and a half times the size of Bali. The government has paid much attention to business permit holders since the massive fire in 2015. Joko Widodo declared Presidential Instruction No. 11/2015 as vigorous law enforcement to control fire inside timber concession. Consequently, when a company is proven guilty, the government has the right to enforce sanctions ranging from imposing a fine to revoking a business license. These forest fires keep happening inside or outside timber concession, peatland, or forest area. Given the state of affairs, the study seeks to address the forest fire reoccurrence and their size using regional-spatial information. Specifically, the following two questions are addressed. First, do the recurrent fires positively correlate with timber concession, peatland, and forest area? Second, does the fire size positively correlate with timber concession, peatland, and forest area with recurring fire?

The fire has a high likelihood of reoccurring inside the peatland, and the previous studies established that the nature of the peatland makes this area nonadaptive to fires. Human activities inside the peatland make this area sensitive to deforestation (Murdiyarso et al., 2010; Page et al., 2009a). Activities within dry peatland can ignite a fire on the surface. This has been reported in several studies, and they suggested that it is essential to keep the surface humid and keep the water table level under control to prevent fire (Langner and Siegert, 2009; Wooster et al., 2012; Wösten, et al., 2006; Yulianti et al., 2012). Sadly, many people still do not know these facts and consider peatland as an unproductive swamp that should be drained. In fact, it was activities in peatland and swamp that lead to 1997-98 forest fires in South Sumatra (Tacconi et al., 2006). Besides, the Ministry of Environment and Forestry reported that one-third of burned areas are inside peatland.

Previous studies show that forest fire correlates with timber concessions. Hoffman et al. (1999), Potter and Lee (1998) and Stolle et al. (2013) found the evidence from satellite imagery and maps of active fires (hot spots), suggesting that the most extensive fires and smoke originated from the government-owned plantation and logging timber concessions. Another research by Tacconi et al. (2006) also supported this argument by stating that the development of timber companies, settlements, and roads tends to increase fire risk. Besides timber concession, past literature revealed that forest area is associated with forest fire reoccurrence. Due to forests' use as the primary source of life, people try to utilize them easily and cheaply. (Purnomo et al., 2017) described that people use fire for land clearing because it is less expensive than using mechanical tools. Additionally, the forest area that is not inside the timber concession boundary has a high risk of being burned (Gaveau et al., 2016).

Even though some studies in forest fire issues have been conducted using a similar method and similar data type, most of them focused on investigating only a one-time significant forest fire incident. However, now in Indonesia, forest fire happens occasionally every year. Thus, this research can be considered to complement the previous studies by combining not only the spatial process but also conducting the statistical procedure. Moderately, this study tries to fill in the gap by examining the forest fire reoccurrence. Given the literature, it can be hypothesized that forest fire can occur and reoccur in peatland, timber concession, and forest areas. Comparatively, in terms of the size of the burned area, it can be hypothesized that the size is larger after fire reoccurrence because people feel safe to make repeating combustion. This research uses probit and tobit regressions to test the hypotheses by utilizing the regional-spatial panel data from The Ministry of Environment and Forestry of Indonesia.

The strength of this study is using time-series data of the burned areas from 2015 to 2018. Indonesia suffered from a widespread fire in 2015, and it kept on going three years later. Previous studies used only one single specific data and did not consider the reoccurrence of fire. There is a high chance that one area burned more than once while the geographic method could capture the reoccurrence event. The empirical method is used to see the correlation of forest fire reoccurrence on the other variables. The highlight of this research is to emphasize the trade-off of government policy for preventing the environment and investment in the forest area.

2. Methodology

This study uses regional-spatial panel data from the Ministry of Environment and Forestry (MoEF) from 2015 to 2018, such as area size, timber concession, peatland, and forest area. This data can be accounted for because it has passed the field survey checking. The original form of unit analysis of the dependent variables is polygons of burned areas (hectare). The independent variables consist of the peatland, forest area, and timber concession in a polygon (hectare). Thus, this research transforms these polygons from numerical into categorical data.

This study utilizes two procedures, spatial and empirical. The first procedure of the spatial process aimed to form the panel data structure. The panel data were further analyzed using probit regression. This empirical method is used to see the correlation of forest fire reoccurrence on the other variables. Tobit regression is later applied to see the correlation between the size of forest fire and other variables,. Finally, the statistical regressions will generate the marginal effects of the independent variable.

This study focuses on the occurrence and size of the burned area as dependent variables. Ministry of Environment and Forestry (MoEF) generates the burned area data based on Moderate-resolution Imaging Spectroradiometer (MODIS) for hotspot and Land Satellite (LANDSAT) with a high resolution. The first independent variable imperative to discuss is the peatland. Peatland is characterized by organic material decomposition and water. This spatial data is based on MOEF regulation number P.60/2019, with a scale of 1:250.000.

Another independent variable is the forest area, which also comes from the MoEF scale of 1:250.000. The definition of forest area in this study is the areas or regions with legal status, function, location, and the boundary as a state land forest. The forest area has three functions: conservation, preservation, and production. People can utilize forests under the state's control, and its use is limited only in the production area. All activities in the forest must be based on a clear legal basis related to the forest area. This legal basis is closely related to the risk of illegal deforestation.

The third independent variable is timber concession, which also comes from MoEF. Timber concessions are firms that have a legal business license from the government to use the forest products inside the forest area. The government grants this license to individuals, cooperatives, Indonesian private's companies, and state or regional government-owned companies. The licensing process includes boundary arrangement, a recommendation from the governor, technical supervision, proposal evaluation, mapping the area requested. Additionally, if the areas are legitimate, the timber concessions have to pay non-tax state revenue. Indonesia's forestry law states that timber concessions must be responsible for fires in their area.

Furthermore, there are other kinds of utilization in forest production areas, such as non-timber production and environmental services. However, these types of users do not involve in cutting down trees. This study excludes these non-timber and environmental services firms. Even though palm oil plantation also causes forest fire, this study eliminates oil plantation to focus only on the forest area. This is because the location is outside of the forest boundary.

This study modifies polygons, originally in a hectare, into binary numbers by implementing the spatial process illustrated in figure 1. This process starts from intersecting every polygon of the burned area from 2015 to 2018. The non-overlapping polygons indicate an unburned area (identified as 0) or burned once (identified as 1). On the other hand, overlapping polygons mean that the locations experience fires more than once (2 = burned twice; 3 = burned three times, 4 = burned four times). Then, for the fire reoccurrence context, the repeating burned area is valued as one and not repeating valued as 0.

The next procedure is intersecting the polygon of forest area, peatland, and logging timber concession with repeating burned areas. These new classifications consist of categorical data 1 and 0. In detail, this research identifies repeating burned areas inside timber concession, inside the forest area, and inside peatland as 1. Otherwise, the fire reoccurrence outside these boundaries is classified as 0. Thus, the panel data is ready to be examined using the probit model.

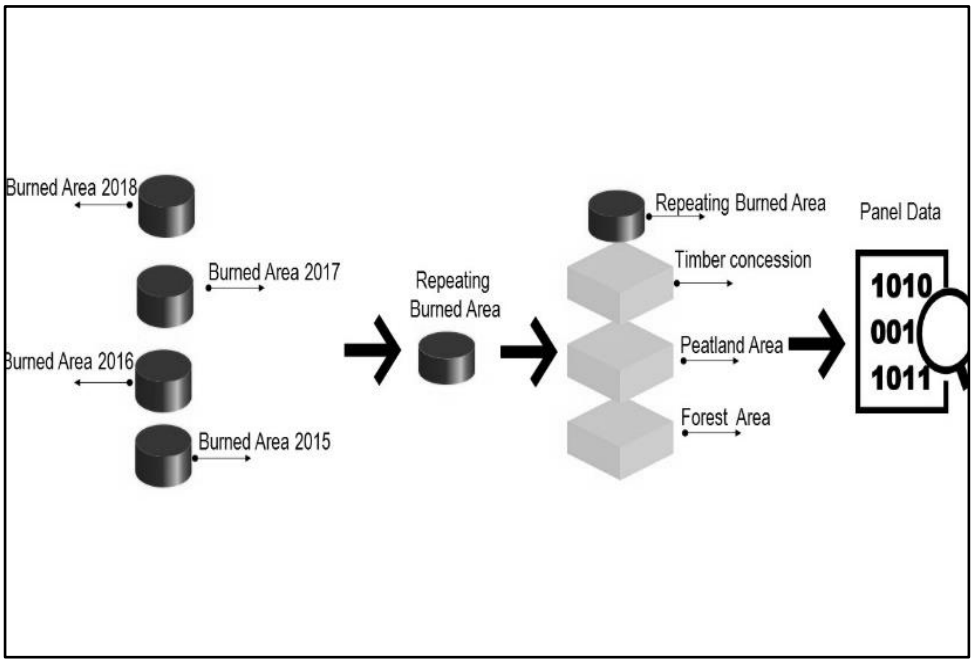


Figure 1. Spatial Methodology of Repeating Burned Area (Own elaboration)

The illustration of fire reoccurrence is drawn in figure 2. The burned area location is in Papua Province, east part of Indonesia. This forest fire map consists of information related to peatland, timber concession, and forest area. *CONS* means the timber concession area, *Forest_ ID* refers to the forest area, *Fire_Repeat* shows the forest fire repeating, *LUAS_ALL* implies the size of the polygon in a hectare, *Peat_ID* illustrates the peatland, and *repeat* is how many times the fires repeat. Additionally, the dark area on the map shows the repeating burned area (identified as 1), and the light area is otherwise (0). The dark one represents the area outside the timber concession (0), outside the peatland (0), inside the forest area (1), and has the size 155.64 Hectare.

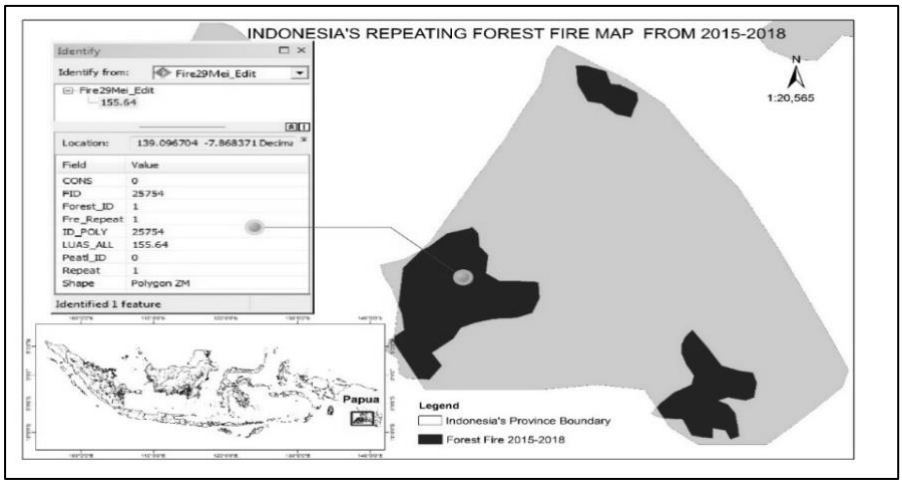


Figure 2. Burned Area (Own elaboration)

This spatial process generates forest fire polygons from 2015 to 2018, including variables needed for this research. In detail, the polygons contain information about fire occurrence, size, and repeating (or not) events. Besides, the location of fires, inside (outside) timber concessions, peatland, and forest area are included as influential factors through this process. As explained before, the polygons are now categorical. All variables involved in this spatial panel data are described in Table 1

Table 1: Variables included in the analysis.

	Type
Dependent Variables	
Forest Fire re-occurence	Categorical
(1= 100% Re-occurrence; 0= otherwise)	
Forest Fire Repeating Event	Categorical
(0= not burn 1= burned one time; 2 =burned twice; 3 =burned three times 4= burned four times)	
Forest Fire Size (Hectare)	Numeric
Variable of Interest	
Timber concession	Categorical
(1= inside timber concession ; 0= outside timber concession)	
Peatland	Categorical
(1= inside peatland ; 0= outside peatland)	
Forest Area	Categorical
(1= inside forest area ; 0= outside forest area	

Source: Own elaboration

The panel probit regression is suitable to examine the correlation of dependent and independent variables, regarding dependent variables that are discrete binary data, which are repeat or not repeat burned areas (the values of 0 and 1). The methodology also depends on the research objective, and this study explains the correlation between the peatland, the forest area, timber concession, and the repeating fire. Then, the marginal effect of a change in the explanatory variable on the dependent variable's expected value is calculated.

The following basic specification is used :

$$Repeating_{area} = \beta 0 + \beta_1\, concession + \beta_2\, peatland\ area + \beta_3\, forest\ area$$

Repeating is the dependent variable that describes an area that has been burned more than once. The variable was set as a dummy variable, in which 1 is equal to the area burned more than once, while 0 is equal to otherwise. Timber concession is the dummy variable that indicates the area of timber concession. The value is 1 when the fire occurs inside the timber concession and 0 if it occurs outside the timber concession. *Peatland* is also a dummy variable referring to the area of peatland. The value of 1 is assigned when burned area takes place inside the peatland, and 0 is given if it takes place outside the peatland. *Forest area* is another dummy variable indicating the forest area. The value is 1 when burned area occurs inside the forest and 0 if it happens outside the forest.

The next research objective is to know the influence of repeating fire, timber concession, peatland, and forest boundary on the size of forest fire in Indonesia. In this study, tobit is an appropriate method since the outcome variable (burned area size) can be either a positive or a zero. In other words, this research cannot use the linear regression model because in linear regression, predictions may be negative, and the effects of explanatory variables are linear. Thus, tobit regression is an appropriate way for these kinds of circumstances.

Then, for this case, The following basic specification is used

$$y^* = \beta_0 + \beta_1 x_1 + \cdots + \beta_k x_k + u, u|x \sim N(0, \delta_2)$$

$$y = \max(0, y^*)$$

Where *y** is the observable latent variable of burned area size, while x_1 to x_k is the independent variable (timber concession, forest area, peatland). E, *y* is the observable outcome of burned area size.

Thus, this research can be considered to complement the previous studies by combining the spatial process and the statistical procedure. These procedures enable us to fully utilize the nature of the regional-spatial panel data by transforming the information into categorical and numerical variables. probit regression is utilized for the examination of timber concession, peatland, and forest boundary that correlate with the occurrence of forest fire in Indonesia. Tobit is used to test the association of timber concession, peatland, and forest boundary on the size of forest fire in Indonesia. Both of these quantitative analyses are needed to explain the possibility of forest fire reoccurrence and its size. The

probit regression is suitable for analyzing the correlation between the fire's repeating event and every independent variable. The tobit regression **is** appropriate for the analysis of the size of the repeating burned area. This study can extend the data from 2000 to 2020 and build up the cross variable analyses for future research. An example is the fire event analysis that reoccurs in the timber concession inside the peatland area.

2.1 Trends and Situation of Forest Fire in Indonesia

This paper uses two kinds of data processing, spatial and statistical processing. After conducting the spatial processing, the study generates information about the frequency and location of repeated fires. Table 2 shows the percentages of forest fire repeating events. The percentage of fires gradually decreases after the first fire. The share of the repeating area is approximately 5.03 % (Twice, Three Times, Four Times) of the total area, and the majority of fires occur only two times in the same area (4.5%). Such a low figure indicates that after 2015 people no longer intend to ignite the fire in the same location twice

Table 2. Forest Fire Repeating Event

Repeating Event	Percent (%)
Not Burn	77,2
Once	17,77
Twice	4,5
Three Times	0,5
Four Times	0,03

source: own elaboration

Table 3 below show that from 2015 to 2018, the trend fluctuates. Moreover, from 2015 to 2016, the number of fires sharply decrease from 48792 to 5696 before it steadily rises again in 2017 and 2018. There are 16 possibilities of repeating fire from 2015 to 2018 because fire can occur randomly. For instance, peatland forests were scorched in 2015, and the fires came back in 2017. Another alternative is that it may be scorched every year. The existence of these forest fires is displayed in table 3. The table shows that most forests are burned in the same location twice, in 2015 and 2018. Even though the statistical analysis shows that burned frequency is three to four times, the observation number is small.

Table 3. The Frequency of Forest Fire Occurring

Fires Occurrence (Year)	Burned Frequency	Number of Observation
Not Occur	0	488156
2015	1	48792
2016	1	5696
2017	1	12316
2018	1	45256
2015 and 2016	2	2064
2015 and 2017	2	2964
2015 and 2018	2	17392
2016 and 2017	2	684
2016 and 2018	2	2224
2017 and 2018	2	3452
2015, 2016 and 2017	3	196
2015, 2016 and 2018	3	956
2015, 2017 and 2018	3	2068
2016, 2017 and 2018	3	320
2015, 2016, 2017 and 2018	4	176
Total		632.712

source: own elaboration

As a climate factor, ENSO plays an essential role in forest fire events because it triggers fire ignition. ENSO or popularly known as El Niño, causes abnormal temperature and precipitation rainfall rate, which can manifest into extensive drought around the regions affected. Figure 3 shows that an increase in 2015 hotspots started in August, peaked in September and October, and then dropped dramatically in November. The trend occurs in all provinces in Indonesia. A decrease in hotspot data by November was caused by increased rainfall. This study argues that forest fire in Indonesia keeps appearing every year, or in other words, forest fire will appear in the El Niño season (or not). The fire will appear as the result of abnormal temperature, precipitation, and the drying peatland. However, fire events will increase during the dry season in rainforest countries if fuels are abundant. El Niño may occur, but fire activities will not take place if enough fuel is unavailable.

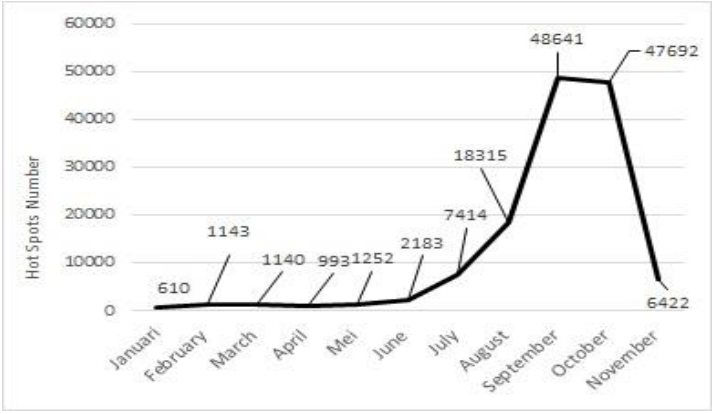


Figure 3. Hot Spots in 2015 (Indonesia's Ministry of Environment and Forestry, 2015)

Figure 4 below shows that the forest fire reoccurrence in Indonesia has a specific spatial pattern. For instance, as the world bank mentioned earlier, Central Kalimantan, South Sumatra, South Kalimantan, West Kalimantan, and Papua suffered from a massive fire in 2015 and fire reoccurrences for the past three years. All of these provinces had the same land traits; they all are peat provinces. In contrast, in East Nusa Tenggara, which is mainly covered by savanna grassland, the fire is used to cultivate grass for cattle and improve hunting visibility (Dennis et al., 2005; Tacconi and Ruchiat, 2006).

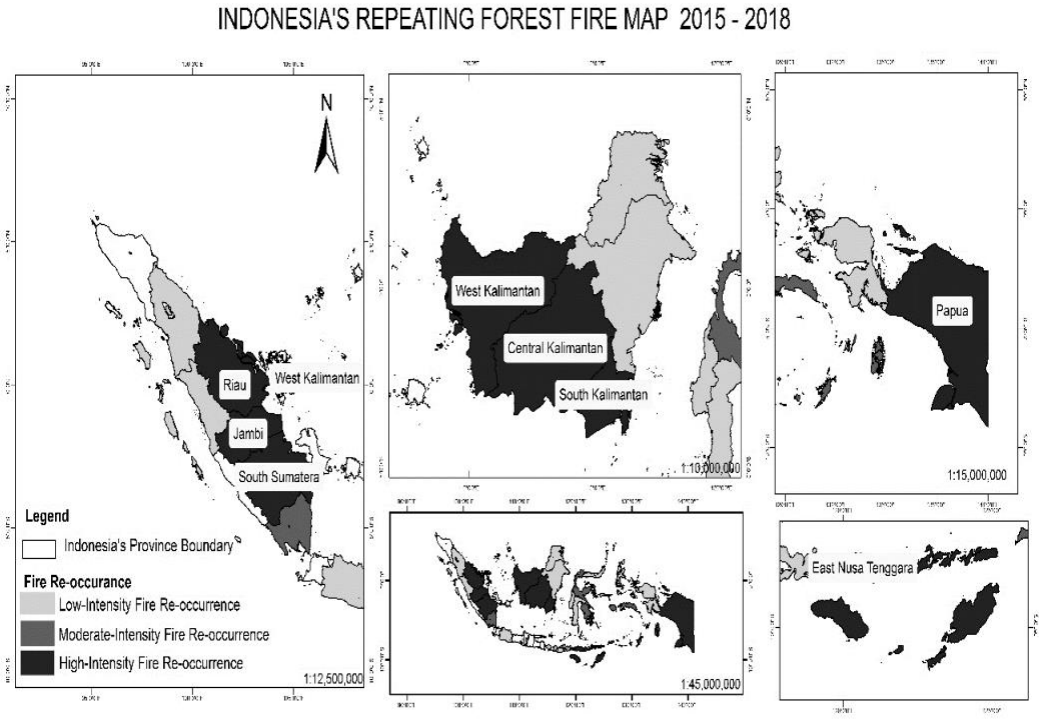


Figure 4. Repeating Forest Fire Map 2015 - 2018 (Own elaboration)

Figure 5 shows spikes in the number in 2004, 2006, 2009, and 2015 of hotspots compared to any other year in the last 16 years. The catastrophe related to the El Nino phenomenon was befalling in Indonesia at that time. Land and forest fire caused 80% of the area in Sumatra and Kalimantan covered in dense smoke. In 2015, after the massive fire, efforts to prevent and manage land and forest fire disasters ran well while the number of hotspots drastically dwindled.

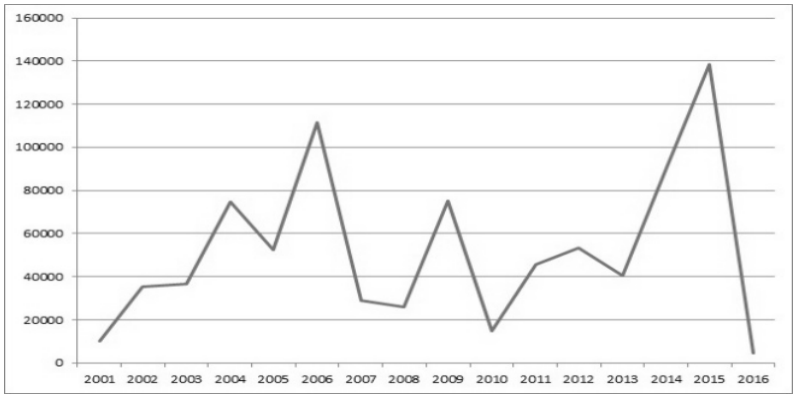


Figure 5. Hot Spots from 2001-2016 (Indonesia's Ministry of Environment and Forestry, 2016)

The climate is difficult to control; hence the peatland easier to manage. The peatland should have proper water table management since humid peat is more adaptable to fire. (Page et al., 2004) reveal that during the El Niño season, groundwater may decrease and creates peatland fire. Additionally, (Jauhiainen et al., 2014) opine that extreme drainage peatland can lower the canopy, exposing peatlands to fiercer solar penetration. Deforestation activities can increase the temperature of the peatlands.

Indonesia's government tries to protect and restore degraded peatland by issuing several policies. Presidential Instruction No. 8 of 2015 suggests a moratorium license for timber concessions to promote deforestation in the peatland. Another policy that governs the restoration of the production forest is Environment and Forestry Ministerial Decree No. 77/2015. This regulation is considered the government's effort to give an understanding of how to manage timber concession within Indonesia's peatlands.

2.2 Challenges in Combating Forest Fire

The government programs to prevent fires sometimes meet many obstacles. Further, the loss of the peatland from 2015 to 2018 is described in Figure 6. The government succeeded in diminishing burned areas to only 8% in 2017; however, in 2018, the peatland fire increased to 25%. The increasing number of fires in 2018 indicates that the number of land degradation is way too large, and it takes time to become wet again through dry season onset. The peatland loss is hard to rehabilitate quickly because it takes more than a thousand years to form the peat layer.

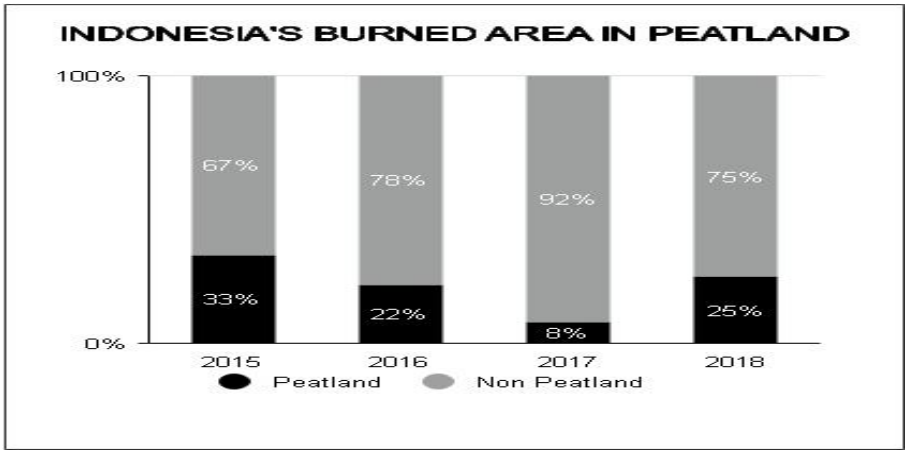


Figure 6. Indonesia's burned area within peatland (Indonesia's Ministry of Environment and Forestry, 2018)

Figure 7 displays a comparison between fires in forest areas and non-forest areas. The share of fire events in forest areas increases from just 30 percent in 2015 to over a half in 2018. There is a possibility that the burned areas have already been open areas without dense canopy. Furthermore, fire is likely to appear from a bush or shrubland near the forest area, and because of the nature of fire, it can easily infiltrate the forest.

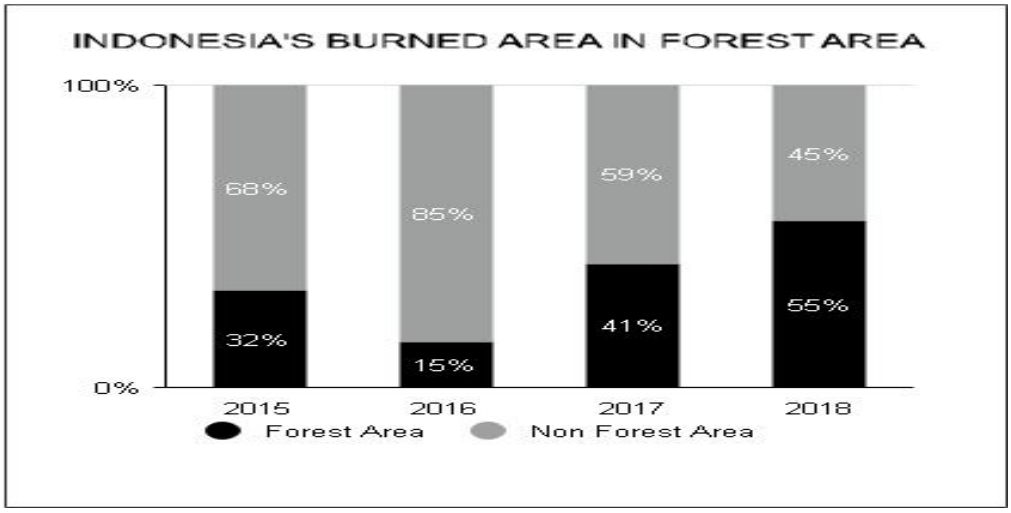


Figure 7. Indonesia's burned area within the forest area (Indonesia's Ministry of Environment and Forestry, 2018)

These two scenarios make sense if we adopt the forest-fire exploitation cycle (Byron and Shepherd, 1998; Nepstad et al., 1999). The cycle starts by opening the forest for logging or road construction. Next, the sun can easily penetrate the forest floor and decrease moisture so the resulting forest will dry out. Once the tree cuts, the forest suddenly loses the immunity to fight the fire, and the deadwood that is left behind will support combustion as a fuel. Subsequently, after the forest was on fire, it will provide more open space, which is more inflammable. Consequently, the forest will completely be replaced by grassland if this cycle continues.

The composition between timber concession and repeating forest fire shows in the crosstab table below. Table 4 displays that 0.34% of fires occur more than once inside the timber concession. This small number of fire occurrences indicates that timber firms try their best to keep the business area clear from fire throughout the time. However, as seen in table 4, more than 90% of fires are from outside timber firms' working areas. Consequently, firms have two obligations. They must prevent the fire from appearing in their areas and keep the fire away from their surroundings.

Table 4. Crosstab forest fire and timber concession

		Timber concession		Total
		0	1	
Repeating	0	545,272 (86,18%)	54,944 (8,68%)	600,216 (94,86%)
	1	30,340 (4,8%)	2,156 (0,34%)	32,496 (5,14%)
Total		575,612 (90, 98%)	57,100 (9,02%)	632,712 (100%)

source: own elaboration

Besides the big scale corporation, a small scale of human activity whose livelihood depends on the forest also exists. This research argues that the small scale of human activities for economic intention is hard to measure. Also, the data that prove small-scale human activities causing the fire are limited. The vast area of the Indonesian forest makes people easy to enter the forest boundary and ignites a fire. Gaveau et al. (2017) demonstrate that satellite imagery can show the pattern of small-scale farmers' activities. The small parcels of irregular shape, size, and direction are an indication of small scales activities. This satellite delineation method is suitable for a limited area such as Riau Province. In contrast, it is challenging to make a delineation for all Indonesia regional areas.

Table 5 reveals that although the share of repeating fire in the peatland is relatively small at only 1,84 %, the government cannot be off guard to prevent fire because once the peatland is burned, it will be difficult to put out. Consequently, if the fire appears for weeks in the peatland, it will produce more smoke than other forest types (Yeager et al., 2003). This type of forest generates carbon dioxide two times more than other forest types (Varma, 2003). The world bank counts that the effect of haze causes more than 500.000 cases of acute respiratory infections, and 19 people passed away in 2015.

Table 5. Crosstab forest fire and peatland.

		Peatland		Total
		0	1	
Repeating	0	470,516 (74,36%)	129,700 (20,5%)	600,216 (94,86%)
	1	20,852 (3,3%)	11,644 (1,84%)	32,496 (5,14%)
Total		491,368 (77,66%)	141.344 (22,34)	632,712 (100%)

source: own elaboration

Before moving forward to repeating fire, we can see from table 6 that the gap between fire share inside and outside the forest is just 6%. This data reveals two scenarios. First, people unintentionally ignite fires inside the forest area because they do not have enough knowledge about forest boundaries. The forest border sometimes vanishes over time, and people easily enter forest areas without pretension. Even though the legitimation of the forest boundary is drawn in a forest area map, sometimes people are not familiar with it. In Indonesia, more than 50% labor force is dominated by the lower level of education; most education levels are junior high school or below (Pratomo et al., 2020). A low level of education somehow forms people's mindset about forest boundaries.

Table 6. Crosstab forest fire and forest area.

		Forest AREA		Total
		0	1	
Repeating	0	280,116 (44,27%)	320,100 (50,59%)	600,216 (94,86%)
	1	13,884 (2.19%)	18,612 (2,94%)	32,496 (5,14%)
Total		294,000 (46,47%)	338,712 (53,53%)	632,712 (100%)

source: own elaboration

The possibility is that the combustion actors are aware of the forest area; however, they keep burning it because they think no one owns the land, and they want to acquire it. However, the table shows that the fires appeared inside the forest area for approximately 53%. Further, in terms of repeating fire, we can see that people choose to set fire at the same location inside the forest area (2,94%); hence, they are not afraid to get caught by the authority. Besides, forest rangers do not have enough resources and supplies to control all areas. To put it in perspective, the total area of Indonesia's forest is 125 million hectares, while the number of forest rangers is only around 2650. In other words, one forest ranger must control 47 thousand forest areas.

Kalimantan even issued a Guideline for Land and Gardens Opening (Governor Regulation 52/2008, revised in 2010). It contains specific points about logging and burning forest for agriculture because a vast majority of people depend on logging and burning forest to sustain their livelihood.

Table 7 shows that all data except the burned area's size is categorical (the minimal values are 0 and maximal 1). In detail, the repeating forest fire on average is only 0.05, nearly to 0. The average of the burned area is 103 hectares, which equals ten times the rugby football field. The fire reoccurrences mostly happen outside the timber concession, as seen in the average value of this variable (0,09). In contrast, the statistics reveal that more than half of the fire events appeared inside the forest boundary. On average, fire reoccurrence in the peatland area is only 0,22, and it is insignificant compared to the forest area. This data reveals that people do not set fires in the same area twice. However, if people choose to do it, they choose the location outside the timber concession but still inside the forest boundary that does not have licenses. This statistic also reveals that people do not prefer to set fire on the peatland.

Table 7. Summary statistics

	Average	SD (….)	Min	M
Dependent Variables				
Forest Fire Occurrence (0= not repeating; 1= repeating)	0.05	0.22	0	1
Forest Fire Size (ha)	103,83	1825,26	0.000001	2
Independent Variables				
Timber concession (0 = outside timber concession; 1 = inside timber concession)	0.09	0.28	0	1
Peatland (0 = outside peatland; 1= inside peatland)	0.22	0.42	0	1
Forest Area (0 = outside forest area, 1 = inside forest area)	0.53	0.49	0	1

source: own elaboration

3. Results and Discussion

This research has two objectives. The first is to reveal a correlation between every independent variable and the reoccurrence of fire. The second objective is to determine the relationship between the frequency repeating, peatland, timber concession, forest area, and the size of the forest fire. This study applies probit regression and calculates the marginal effect to answer the first research problem. Additionally, table 8 shows that the correlation of fire reoccurrence on timber concession is negative and is contrary to another variable.

Table 8. Marginal effects of estimated parameters for probit regression

Variable	Marginal effects
Timber concession	-0.221773***
	(0.0036)
Peatland	0.349033***
	(0.0023)
Forest Area	0.0060397***
	(0.0021)

**significant at the 10%; **significant at the 5% level; ***significant at the 1% level*
source: own elaboration

The result reveals that the chance of fire reoccurrence inside the timber concession is 22% lower than outside the timber concession. On the other hand, peatland has a higher probability of fire by 34.9% than outside the peatland. Fire reoccurrence is also 0.6% higher inside the forest area. Predictably, peatland contributes the highest share because of its flammable characteristic–dry peat can trigger fires. Thus, economic activities through deforestation and drainage of peat canal can lead to a fire.

The interpretation is consistent with the hypothesis that fire reoccurrence in the same location inside the peatland is higher than outside the peatland. This finding is aligned with the finding from Tacconi & Ruchiat (2006), which explain that in the South Sumatra fire in 1997-98, the fire occurs because of commercial peat exploration. In the massive fire of 2015, around one-third of the burned area was peatland. It created a heavy haze covering a considerable part of Indonesia and the surrounding areas, bringing adverse effects to many sectors (World Bank, 2016).

The forest area results match the hypothesis that the risk of burning in the same location inside the forest area is higher than in the outside. This incident happens because people view the forest area as unclaimed land, and burning it is a simple step to claim the land (Purnomo et al., 2018). This finding corresponds to the research conducted by Cattau et al. (2016) and L. Tacconi et al. (2007). In Indonesia, the total size of the forest area is 125 million Ha and 67 Ha for the non-forest area. However, half of the non-forest areas are occupied for settlement, cultivation, and infrastructure. Consequently, people enter the forest area to occupy it since they think the field is unowned.

Nevertheless, the timber concession variable shows a different story. At the beginning of this research, it is hypothesized that timber concession has a positive correlation with repeating fire. However, after conducting tobit regression, the result reveals otherwise. The finding shows that the business owners consider the benefit of burning their land outweighs the government's sanction and punishment. Moreover, MoEF in 2018 informed that the government would impose a fine of up to 1.2 billion to a private company committing environmental crimes.

Table 9. Marginal effects of estimated parameters for tobit regression

Variable	Marginal effects (Ha)
Repeating once	-44.14085***
	(12.17)
Repeating twice	-39.22793
	(31.52)
Repeating three times	-41.44623
	(126.41)
Timber concession	92.79891 ***
	(16.44)
Peatland	43.91306 ***
	(10.63)
Forest area	22.15367 **
	(10.42)

**significant at the 10%; **significant at the 5% level; ***significant at the 1%* level in Ha
source: own elaboration

Table 9 above reveals several important highlights. First, the size of the burned area correlates with the first fire's repeating event. In detail, holding everything else constant, the burned area's size decreases by 44 Ha when the first fire reoccurrence happens. On the other hand, the second and third fires are not significantly correlated with the burned area's size. The burned area becomes larger by 92 Ha if a fire occurs inside the timber concession**,** followed by 43 Ha if it happened within the peatland. Thus, the burned area's size for fire reoccurrence inside the forest area increases by 22 Ha compared to outside the forest area.

This timber concession's result corresponds with the hypothesis that the size of forest fire has a positive correlation with timber concession. Unpredictably, the burned area gets larger, nearly about 100 ha. This result leads to the question; who is responsible for the fire inside the timber concession? The government sticks to article 41/1990 of the Forestry Law, which states that each timber concession is responsible for forest fires in their working areas. Hoffman et al. (1999), Potter and Lee. (1998), and Stolle et al. (2013) found evidence that the most extensive fires and the most significant amounts of smoke are originated from government-sanctioned corporate plantation development, logging timber concessions, and large-scale land-clearing/ development projects.

The peatland's tobit result is also coherent with the hypothesis, which informs that the fire polygon size will be larger if it occurs inside the peatland. In relation to this, the government shifts the approach from reactive to preventive by establishing the Peatland Restoration Agency in January 2016. This action was successful in reducing fire from 22% in 2016 to 8% in 2017. Even though peatland restoration is a long time effort, this study hopefully can encourage the regulator to preserve the peatland.

Furthermore, this study depicts that forest area positively correlates with the burned size and is in line with the hypothesis. There are some reasons people decide to set fire inside the forest. Firstly, Law enforcement is relatively weaker, and the government does not have enough resources to patrol all forest areas. Secondly, people depend too much on the forest to make livings; for instance, some community groups use fire as a tool for catching fish, finding honey, or making a small plot to grow rubber or maize. These community groups do not have mechanical tools and are not aware of the environmental standard for land clearing. Tomich et al. (1998) explain that fire is a tool to fight back in collective conflict.

Besides, there is no cheaper alternative method than using fire for land clearing. Furthermore, fertilizers and pesticides are not as cheap as burning to increase soil fertility (Brandi, et al., 2015; INOBU, 2016)

The previous study has discussed fire occurrence in timber concession, peatland, and forest (Ardiansyah et al., 2017; Dennis et al., 2005; Gaveau et al., 2017; Tacconi et al., 2007). Thus, this study tries to supplement forest fire information by discussing reoccurrence fire in timber concession, peatland, and forest. This study reveals that the majority of fire reoccurs only two times. It does not repeat in the following year, and the coincidences of repeating fires are lower in the timber concession area. Besides, the burned area's size will decrease if the fire appears more than once in the same location. Additionally, the fire area will be larger if it appears inside timber concession, peatland, and forest area.

Furthermore, after the analysis, it can be concluded that fire reoccurrence has a negative association with the timber concession area. Compared to the peatland and forest area, it is easier for the government to manage the timber concession since the ownership is evident. Therefore, the government should strengthen law enforcement. For instance, the government may impose significant fines and revoke the business licenses for timber concessions proven to violate the rules.

As an unclaimed land, the same policies as the timber concession are hard to impose on the forest area. Unclear ownership is the main problem for the forest area. The officers cannot penalize fire actors as long as they are not caught when burning within the forest area. It is also impossible to prevent people from doing forest clearing because it is their livelihood. Furthermore, now government policy should focus on keeping the nature of peatland. Preventive action is more suitable in peatland than reactive action.

Conclusion

The forest fires in Indonesia have been repeating every year and reached a peak in 2015. Additionally, the government issues policies to prevent the fires from reoccurring. After 2015, the number of fires declines is aligned with the government intervention. This research focuses on the reoccurrence of forest fire events after the interference. Previously, it was hypothesized that fire repeating events and burned area size have a positive relationship with timber concession, peatland, and forest area. Thus, the two-step procedures, spatial and statistical, were conducted to examine the hypotheses. This research contributes to the previous studies by combining the spatial process and conducting the statistical procedure. The spatial process is used to construct a repeating fire dataset, while probit-tobit regression is applied to test the relationship between variables. This study utilized the panel data from the Ministry of Environment and Forestry from 2015 to 2018.

First, this research reveals the correlation between every independent variable and the fire reoccurrence. Most fires between 2015 and 2018 reoccured only twice, not in the following year inside peatland and forest areas. However, the second fire took place outside of the timber concession. For the first incident, the fire tends to have a larger size sequentially inside timber concession, peatland, and forest area. Second, a relationship is observed between frequency repeating, peatland, timber concession, forest area, and the size of the forest fire. Nevertheless, after fire reoccurrence, the size of the burned area shall be smaller. The result implies that the fire reoccurrence is highly related to the timber concession area and area types.

Finally, these research result shows that government intervention significantly reduced chances of forest fire reoccurrence. In other words, to avoid the repetition of a fire event and maintain the size of the burned area, Indonesia should keep improving the policies regarding forest timber concession and adjacent areas to further reduce forest fires event and the associated damage. As a peatland country, where natural fire possibly happens, almost 100% of forest and land fires in Indonesia are caused by human activities either intentionally or unintentionally.

This research suggests that recommendations must fit the needs of each different fire location. The policy that will be implemented in concession indeed has to consider private stakeholder characteristics. Furthermore, forest area policy must consider the nature of peatland and the needs of community groups.

A characteristic firm is to minimize cost and maximal profit. Government policy should regulate not only the punishment but also the reward. If timber concession is proven guilty, the government can freeze its business licenses or diminish its opportunity to get credit. In contrast, tax discount incentives should be awarded to companies that successfully maintain their area free of fire. This policy rewards both stakeholders. The company reduces its expenditure for paying tax while the government lowers the environmental cost to keep the forest safe.

The policymakers should not forget public behavior within the peatland. They dry it to deforest and convert it into productive land. Public mindsets about peatland have to change, and the government should make an effort to change this behavior through policy. Instead of making the area dry, it is better to make it suitable for growing fish through the silvofishery program. The government may give incentives to the community around and within the peatland for fish seedlings. People will voluntarily maintain the water level inside peatland because it is profitable for them.

In contrast with timber concession, a different approach should impose on the forest area. Unclear ownership is the main problem for forest areas. Hence, the officer cannot impose penalties on the actor as long they are not proven guilty in the act set fires inside the forest areas. It is also impossible to prevent people from using the forests because it is their livelihood. An approach that is more reasonable to implement in forest areas is not to impose strict sanctions. However, together with the private sectors, the government has to introduce legal consequences for burning forests. Then, government or timber concession can also reward the community that can keep their forest safe from fire. Incentive policy success was implemented in Riau in 2015 when the great fire event appeared (Watts et al., 2019). However, imitating these programs should be through thoughtful research, trial and error because different locations generate different problems. Indeed, policymakers should first pay attention to what factors make people in other side parts of Indonesia's forest area voluntarily comply with the regulation. Cost and benefit, poverty, and alternative livelihood should be taken into consideration in future research.

Acknowledgments

The authors would like to thank Vid Adriison, Ph.D. (Faculty of Economics and Bussines, University of Indonesia) for research discussion and Koji KOTANI, Ph.D. (Rikkyo University) for his guidance, reviewing my work in detail, and providing helpful feedback.

References

(INOBU), I. B. (2016). *A Profil of Palm Oil Smallholder and Their Challenges of Farming Independently. Jakarta: Inovasi Bumi*.

Ardiansyah, M., Boer, R., & Situmorang, A. P. (2017). Preface: International Conference on Recent Trends in Physics (ICRTP 2016). *Earth and Environmental Science*, *54*(012058). https://doi.org/10.1088/1742-6596/755/1/011001

Brandi, C., Cabani, T., Hosang, C., Schirmbeck, S., Westermann, L., & Wiese, H. (n.d.). Sustainability certification in the Indonesian palm oil sector: benefits and challenges for smallholders (No. 74). Studies.No Title. *2013*.

Byron, N., & Shepherd, G. (1998). *Indonesia and the 1997-98 El Niño: Fire problems and long-term solutions. Commonwealth Forestry Review, 77, 236-236*.

Cattau, M. E., Harrison, M. E., Shinyo, I., Tungau, S., Uriarte, M., & DeFries, R. (2016). Sources of anthropogenic fire ignitions on the peat-swamp landscape in Kalimantan, Indonesia. *Global Environmental Change*, *39*, 205–219. https://doi.org/10.1016/j.gloenvcha.2016.05.005

Dennis, R. A., Mayer, J., Applegate, G., Chokkalingam, U., Colfer, C. J. P., Kurniawan, I., Lachowski, H., Maus, P., Permana, R. P., Ruchiat, Y., Stolle, F., Suyanto, & Tomich, T. P. (2005). Fire, people and pixels: Linking social science and remote sensing to understand underlying causes and impacts of fires in Indonesia. *Human Ecology*, *33*(4), 465–504. https://doi.org/10.1007/s10745-005-5156-z

Gaveau, D. L. A., Pirard, R., Salim, M. A., Tonoto, P., Yaen, H., Parks, S. A., & Carmenta, R. (2017). Overlapping Land Claims Limit the Use of Satellites to Monitor No-Deforestation Commitments and No-Burning Compliance. *Conservation Letters*, *10*(2), 257–264. https://doi.org/10.1111/conl.12256

Gaveau, D. L. A., Sheil, D., Husnayaen, Salim, M. A., Arjasakusuma, S., Ancrenaz, M., Pacheco, P., & Meijaard, E. (2016). Rapid conversions and avoided deforestation: Examining four decades of industrial plantation expansion in Borneo. *Scientific Reports*, *6*(October 2015), 1–14. https://doi.org/10.1038/srep32017

Hoffman, A. A., Hinrichs, A., & Siegery, F. (1999). *Hoffman et al., 1999 - Fire damage in EaKal in*

97-98.pdf (pp. 1–5).

Jauhiainen, J., Kerojoki, O., Silvennoinen, H., Limin, S., & Vasander, H. (2014). Heterotrophic respiration in drained tropical peat is greatly affected by temperature - A passive ecosystem cooling experiment. *Environmental Research Letters*, *9*(10). https://doi.org/10.1088/1748-9326/9/10/105013

L., P., & J., L. (1998). Tree planting in Indonesia: trends, impacts and directions. *Tree Planting in Indonesia: Trends, Impacts and Directions*, *62*(18). https://doi.org/10.17528/cifor/000414

Langner, A., & Siegert, F. (n.d.). Spatiotemporal fire occurrence in Borneo over 10 years. Global Change Biology, 15(1), 48–62. In *2009*.

Murdiyarso, D., Dewi, S., Lawrence, D., & Seymour, F. (2010). *Indonesia's forest moratorium: A stepping stone to better forest governance?. Cifor*.

Nepstad, D. C., Veríssimo, A., Alencar, A., Nobre, C., Lima, E., Lefebvre, P., Schlesinger, P., Potter, C., Moutinho, P., Mendoza, E., Cochrane, M., & Brooks, V. (1999). Large-scale impoverishment of amazonian forests by logging and fire. *Nature*, *398*(6727), 505–508. https://doi.org/10.1038/19066

Page, S, Banks, C, Rieley, J, Jauhiainen, J, Vasander, H. (n.d.). *The role of tropical peatlands in carbon storage and carbon cycling. In: Peatlands in the Global Carbon Cycle, The 2nd International Symposium. 25–30 September 2009, Prague, p. 22*.

Pratomo, D. S., Syafitri, W., & Anindya, C. S. (2020). Expanding Middle Class in Indonesia. *The Journal of Indonesia Sustainable Development Planning*, *1*(3), 307–312. https://doi.org/10.46456/jisdep.v1i3.103

Purnomo, H., Okarda, B., Dewayani, A. A., Ali, M., Achdiawan, R., Kartodihardjo, H., Pacheco, P., & Juniwaty, K. S. (2018). Reducing forest and land fires through good palm oil value chain governance. *Forest Policy and Economics*, *91*(January), 94–106. https://doi.org/10.1016/j.forpol.2017.12.014

Purnomo, H., Shantiko, B., Sitorus, S., Gunawan, H., Achdiawan, R., Kartodihardjo, H., & Dewayani, A. A. (2017). Fire economy and actor network of forest and land fires in Indonesia. *Forest Policy and Economics*, *78*, 21–31. https://doi.org/10.1016/j.forpol.2017.01.001

Stolle, D., & Micheletti, M. (2013). *Political consumerism: Global responsibility in action. Cambridge University Press.*

Tacconi, L., Moore, P. F., & Kaimowitz, D. (n.d.). Fires in tropical forests - What is really the problem? Lessons from Indonesia. Mitigation and Adaptation Strategies for Global Change, 12(1), 55–66. *2007*.

Tacconi, L., Moore, P. F., & Kaimowitz, D. (2007). Fires in tropical forests - What is really the problem? Lessons from Indonesia. *Mitigation and Adaptation Strategies for Global Change*, *12*(1), 55–66. https://doi.org/10.1007/s11027-006-9040-y

Tacconi, Luca, & Ruchiat, Y. (2006). Livelihoods, fire and policy in eastern Indonesia. *Singapore Journal of Tropical Geography*, *27*(1), 67–81. https://doi.org/10.1111/j.1467-9493.2006.00240.x

Tomich, T. P., Fagi, A. M., De Foresta, H., Michon, G., Murdiyarso, D., Stolle, F., & Van Noordwijk, M. (1998). *Indonesia's fires: smoke as a problem, smoke as a symptom. Agroforestry Today, 10, 4-7*.

Varma, A. (2003). The economics of slash and burn: A case study of the 1997-1998 Indonesian forest fires. *Ecological Economics*, *46*(1), 159–171. https://doi.org/10.1016/S0921-8009(03)00139-3

Watts, J. D., Tacconi, L., Hapsari, N., Irawan, S., Sloan, S., & Widiastomo, T. (2019). Incentivizing compliance: Evaluating the effectiveness of targeted village incentives for reducing burning in Indonesia. *Forest Policy and Economics*, *108*(98), 101956. https://doi.org/10.1016/j.forpol.2019.101956

Wooster, M. J., Perry, G. L. W., & Zoumas, A. (n.d.). Fire, drought, and El Niño relationships on Borneo (Southeast Asia) in the pre-MODIS era (1980-2000). Biogeosciences, 9(1). *2012*.

World Bank. (2016). *The Cost of Fire: An Economic Analysis of ' 'Indonesia's 2015 Fire Crisis. In Indonesia Sustainable Landscapes Knowledge Note: 1. World Bank Group*.

Wösten, J. H. M., Clymans, E., Page, S. E., Rieley, J. O., & Limin, S. H. (n.d.). Wösten, J. H. M., Clymans, E., Page, S. E., Rieley, J. O., & Limin, S. H. (2008). Peat-water interrelationships in a tropical peatland ecosystem in Southeast Asia. Catena, 73(2), 212–224. *2008*.

Yeager, C. P., Marshall, A. J., Stickler, C. M., & Chapman, C. A. (2003). Effects of Fires on Peat Swamp and Lowland Dipterocarp Forests in Kalimantan, Indonesia. *Tropical Biodiversity*, *8*(1), 121–138.

Yulianti, N., Hayasaka, H., & Usup, A. (2012). *Recent Forest and Peat Fire Trends in Indonesia The Latest Decade by MODIS Hotspot Data. Global Environmental Research, 16(1), 105–116.*

Vol. 2 No. 1- April 2021

E-ISSN: 2722-0842 | P-ISSN: 2721-8309

Available online at
http://journal.pusbindiklatren.bappenas.go.id/

Research Paper

Public-Private Partnership Scheme In Research and Development: A Bibliometric Study

Tiurma Melissa Rakhel[1*], Parama Tirta WW Kusuma[2], Suardi Kadang[3]

[1,2,3]Indonesian Institute of Sciences, Jakarta, Indonesia
Email: [1]melissa.rakhel@gmail.com, [2]paramatirtawwk@gmail.com, [3]suardi.kadang@gmail.com.

) Corresponding author

ABSTRACT

This article investigates the trends of scholarly publication in PPP research of R&D sector during the last three decades, including the publication patterns of the researchers' network and institutional structures. This article applies Bibliometric method by using VOSviewer to analyze and visualize scientific themes obtained from keywords 'PPP and R&D' through articles published in Scopus indexed journals. In mapping these keywords, this study found out that the most discussed topics include drug development, innovation policy, drug discovery, neglected tropical disease, global health, vaccines, and clinical trials. From these keywords, it could be concluded that the majority of the research areas of this topic focuses on the health sector. Lastly, this paper summarizes some future research directions and gives a recommendation. The recommendation is to make a mechanism for how PPP funding can be carried out in R&D activities. The PPP funding is not only meant for research infrastructure development but also R&D activities.

Keywords: public-private partnership, research and development, bibliometric, VOSViewer

ARTICLE INFO

Received: February 24, 2021
Received in revised form: March 19, 2021
Accepted: April 14, 2021

doi: 10.46456/jisdep.v2i1.109

JISDeP - The Journal of Indonesia Sustainable Development Planning
Published by Centre for Planners' Development, Education, and Training (Pusbindiklatren), Ministry of National Development Planning/ National Development Planning Agency (Bappenas), Republic of Indonesia

Address: Jalan Proklamasi 70, Central Jakarta, Indonesia 10320
Phone: +62 21 31928280/31928285
Fax: +62 21 31928281
E-mail: journal.pusbindiklatren@bappenas.go.id

Supported by Indonesian Development Planners Association (PPPI)

1. Introduction

Public-Private Partnership (PPP) has been widely utilized in various parts of worldwide research emphasizing infrastructure development. PPP opens opportunities for the private sector's involvement to participate in providing public services in the form of infrastructure development (roads, bridges, and hospitals), management, and maintenance. According to Zhang (2005), PPP could provide added value to the output resulting from infrastructure development and sustainability. One of the advantages generated from implementing the PPP financing scheme is the risk-sharing between public and private parties. Rossi & Civitillo (2014) reported that the public and private sectors' participation had certain qualities; when combined, it would ultimately produce good quality. Meanwhile, cooperation and risk-sharing provide the main considerations for the two sectors in combining these qualities.

Of the various sectors developing PPP financing schemes, the research and development (R&D) sector play the central role, to which the government and business entities have currently paid attention. Some examples are evident from the development of R&D infrastructure such as laboratories. For example, the construction of laboratories in Brazil through PPP can augment the economic sector through the autonomy of health technology and technological development in a country (Bonfim et al., 2018).

Along with the exceptionally speedy development of PPP application in various countries, researchers' growing interest during the last two decades to conduct research on the theme of PPP also continues to grow. This improvement has led to significant growth in articles and journals under the PPP theme with various topics, domains, and research methods. The development of academic knowledge of PPP has enabled the researchers to share research findings and explore current conditions and trends about PPP practice (Ke et al., 2009). Similarly, Al-sharif & Kaka (2004) conducted a comprehensive analysis reviewing PPP-related publications in the four selected construction journals from 1998 to 2003. Their review illustrates the coverage of PPP during this period, presenting the gaps that researchers should address in reviewing PPP journal trends and assessing the impact of research on the construction industry.

By considering the crucial role of PPP in relation to R&D, the summary description of research and studies related to these two keywords has provided a literature study along with the related bibliographic approach. A review of literature on PPP and R&D issues through research results and studies have been indexed by Scopus. This systematic literature review is performed to summarize and observe how research and study developments related to PPP and R&D are conducted. According to Helby Petersen (2019), a systematic literature review is described as an appropriate method to provide a concise but comprehensive overview of the developing topic by providing academic evidence. Publications published in Scopus are summarized in this study to enable the readers to navigate the research trends comprising both PPP and R&D issues. It is thus expected that a systematic literature review would address the following questions:

1. When are the keywords in "Public-Private Partnership" and "research and development" used in a Scopus indexed scientific article for the first time?
2. What is the pattern and trend of publication in PPP and R&D research indexed by Scopus?
3. How is the analysis of bibliometric visualization in PPP and R&D studies indexed by Scopus?
4. To link findings on the role of PPP in R&D development with existing concepts and practices in Indonesia, does the PPP issue related to R&D appear in Indonesia in scientific publications indexed by Scopus?
5. To provide a prediction, what are the future research direction?

Literature Review

Bibliometrics is employed to study the interaction between science and technology, produce a mapping of scientific fields, develop new knowledge in a particular field, serve as indicators of future insight to provide a more competitive advantage, and craft the research plans. Bibliometric is a statistical method that can quantitatively analyze research journals on a specific topic through mathematical methods (Chen et al., 2014). Similarly, Reitz (2004) stated that bibliometrics is a mathematical and statistical method to study and identify patterns in the use of literature and library services as material for analysis to determine developments in literature, especially authorship, publication, and use.

According to Glänzel (2003), there are three components of bibliometric, which are: (i) bibliometric for bibliometricians, (ii) bibliometric for scientific disciplines (scientific information), and (iii) bibliometric for science policy and management (science policy). Bibliometrics for bibliometricians becomes the primary bibliometric research domain and has traditionally been employed as a research methodology.

Bibliometric methods have been widely used, especially by information scientists to study the growth and distribution of scientific articles. Researchers may also use bibliometric methods to determine the influence of an author, or to describe the relationship between two or more authors (Tsai, 2011). In addition, bibliometrics can determine the quality of studies, analyze key areas of research, and predict future research directions, such as analyzing trends and forecasts (Tsai, 2015;Tsai & Yang, 2010)

Structured searches were performed on the Scopus database, which is the largest academic database. Analyzing publication trends by utilizing the Scopus online database could help the researchers access the available research journals equipped with built-in analysis tools to produce representative images (Permana & Harsanto, 2020). Further, Scopus's search results could be exported to software for additional analysis, such as through the VOSviewer application, a free computer program for visualizing and exploring bibliometric knowledge maps (Leydesdorff & Rafols, 2012). The advantage of VOSviewer compared to other analytical applications lies in utilizing a text mining function to identify combinations of noun phrases relevant to the mapping and integrated clustering approach and verify data co-citation co-occurrence networks (Eck & Waltman, 2016).

Several previous studies have mapped international publication trends (Ibrahim, 2020) and a systematic literature review related to the PPP theme associated with Infrastructure Development with a locus in Indonesia (Mandasari & Wahyuni, 2019). PPPs have been widely established and are attracting increasing attention. Great efforts have been made to ensure the successful operation of PPP projects. Nikonova (2014), in her journal, stated the main directions of PPP in the field of innovation in Russia, one of which is the innovative orientation of the State order for research and development with public-private financing initiatives. In addition, the OECD STI 2016 describes several types of PPP in research and innovation and examples of programs from several countries. Above all, PPP helps create a collaborative environment to maximize cross-disciplinary expertise among government, academia, and industry. OECD also stated that other benefits could be obtained from the PPP scheme, such as Optimizing the use of resources by sharing costs and risks, and Economies of scale (reaching a critical mass in research) and scope (cross-discipline and cross-sectorial benefits) (OECD, 2016). Therefore, this paper is expected to provide a new scientific visualization method to explore the status and direction of PPP development related to R&D.

2. Methodology

2.1 Data Collection

The data used in this study includes the international publications obtained from Scopus (www.scopus.com). Scopus is acknowledged as the world's largest collection of literature summaries and citations, providing abstracts of peer-reviewed scientific and research literature. Launched in November 2004, Scopus has been a trusted site to access the largest database of abstracts and citations from peer-reviewed literature, indexing journals, and other scientific works, which becomes a standard tool for science policy and research management in recent decades.

This research is considered a bibliometric study by selecting articles in the Scopus database from the initial year of publication to 2020. The use of Scopus as a data reference is because Scopus indexed publications are acknowledged as the global standard in scientific publications and have been widely utilized in the bibliometric analysis. In the data collection process, there was no year delimitation to navigate the issuing year of the keywords utilized by "Public-Private Partnership" and "Research and Development".

2.2 Data Collection Strategy

Search strategies are employed to identify the publications with affirmations as follows: *((TITLE-ABS-KEY ("public private Partnership") AND TITLE-ABS-KEY ("research and development")) AND (EXCLUDE (PUBYEAR, 2021)) AND (LIMIT-TO (DOCTYPE, "ar") OR LIMIT-TO (DOCTYPE, "cp") OR LIMIT-TO (DOCTYPE, "ch") OR LIMIT-TO (DOCTYPE, "bk")))).* The application of quotation marks (“) in obtaining data in Scopus aims to locate the right publication and to discuss the related keywords. To provide a more comprehensive reference,

this study confines the types of article sources, which comprises of "journals", "conference proceedings", "books," and "book series", generating 263 articles.

2.3 Data Analysis and Visualization

This paper utilizes a descriptive research method with a bibliometric approach (Ellegaard & Wallin, 2015; "Meas. Sch. Impact, "2014; Waltman & Noyons, 2018) to examine the scientific literature (Chen, 2017; Xiao & Watson, 2019). This study observes general publication patterns in the number of studies, researchers, academic affiliations, countries, and subject areas. The data analysis is further processed, sequentially arranged, and compiled to present the discussion in the form of tables, infographics, and descriptive interpretation. In addition, this paper employs the bibliometric analysis and visualization produced by VOSviewer version 1.6.15 to visualize and map the analysis by country, keywords, and research topics.

3. Results and Discussion

3.1 Publication Pattern

From the results of data processing performed through Scopus, approximately 263 Documents were obtained related to the keywords "Public-Private Partnership (PPP)" and "research and development (R&D)." Of these 263 documents, the first PPP and R&D keywords appeared in 1986 from Robertson G.E. and Allen D.N.

"….encourage greater university/industry cooperation and focus regional economic development efforts toward innovation and modernization. …. To date, the Commonwealth of Pennsylvania has provided $29 million to the advanced technology centers for joint industry/university ***research and development*** *projects, entrepreneurial development, and education and training."* (Robertson & Allen, 1986)

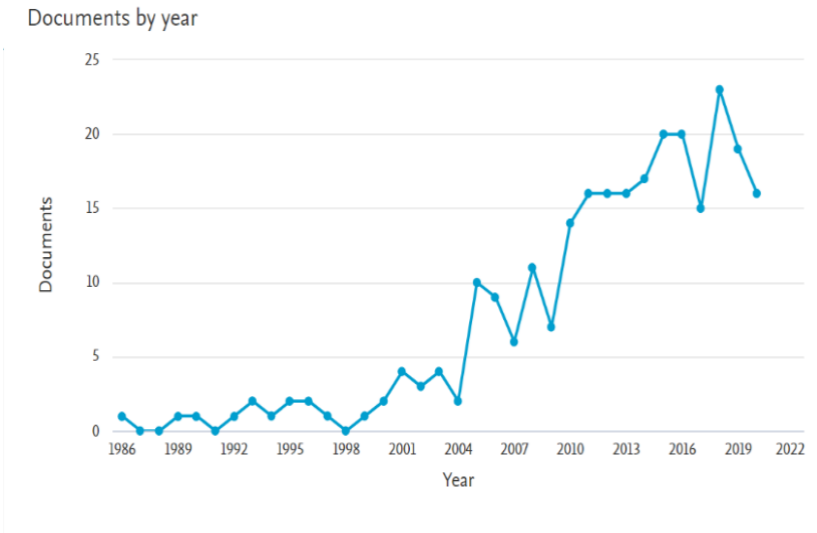


Figure 1. Development Trends in International Scientific Publications with PPP and R&D Keywords

Figure.1 illustrates the Trend of International Scientific Publication. The year 1986 was the first year for the emergence of Scopus indexed scientific publications using PPP and R&D keywords, continuing to increase until 2020. The following Figure.2 illustrates the growing trend of publication in the period of 2010 - 2020.

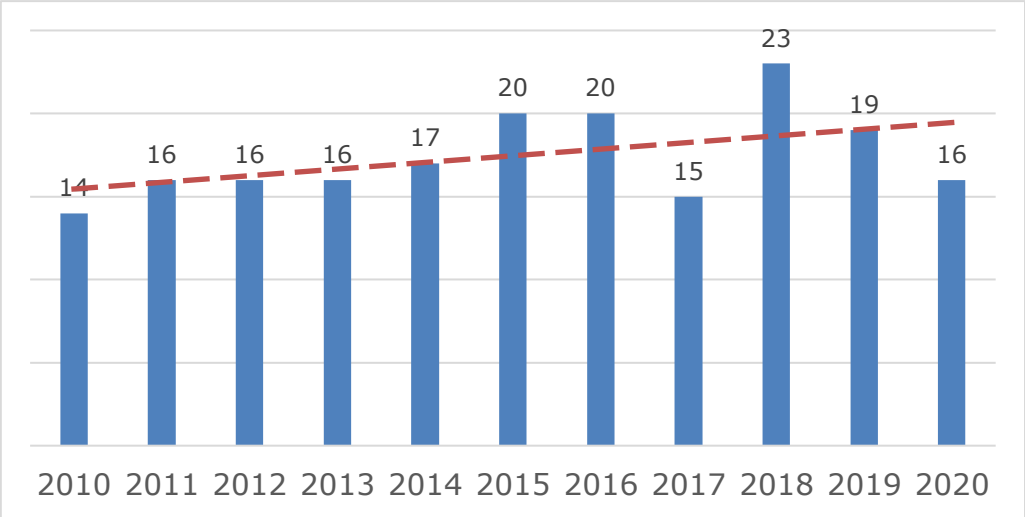


Figure 2. International Publication Trends with PPP and R&D Keywords in 2010 - 2020

The Scopus journal conveys several fields of study, including agriculture, engineering, computer, medicine, and others. Based on the following Figure.3, it is evident that between 1986 and 2020, either researches or publications indexed by Scopus.com related to PPP and R&D were still dominated by research subjects or areas such as Medicine (16.9%), followed by Social Sciences (12.8%), engineering (12.6%), Business Management Accounting (9.09%), and Environmental Sciences (7.1%).

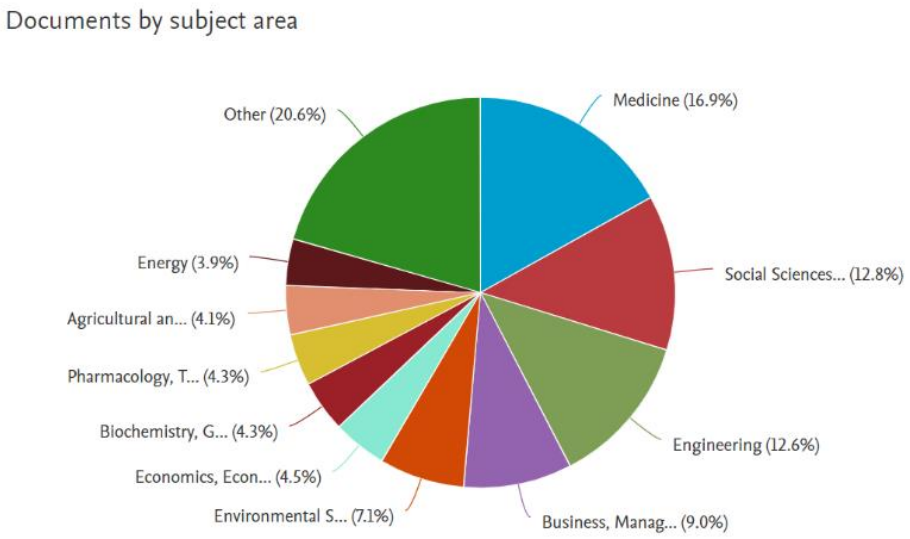


Figure 3.Percentage of Publications based on Research Fields (Subject Areas)

Figure.4 illustrates how Scopus indexed the trend of forms or types of research publications related to PPP and R&D from 1986 to 2020. The scientific articles are the most popular (72.2% equivalent to 190 pieces), followed by Conference Papers of (16.7% equivalent to 44 pieces), Book Chapters of (7.6% equivalent to 20 pieces), and books (merely 3.4% or 9 books).

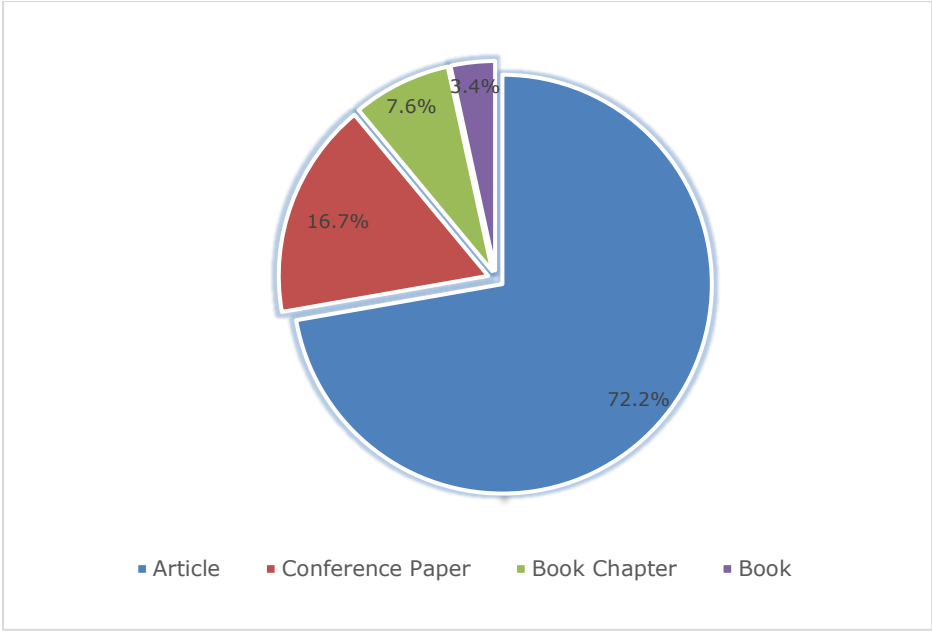


Figure 4. Type of Publication Infographics

Based on Scopus bibliometric metadata, it is revealed that the authors are from 54 countries, and the ten most productive countries are illustrated in Figure.5. The United States becomes the most productive country, publishing 90 articles (34.22%), followed by the United Kingdom with 21 articles (7.9%) and Germany with 18 articles (6.8%).

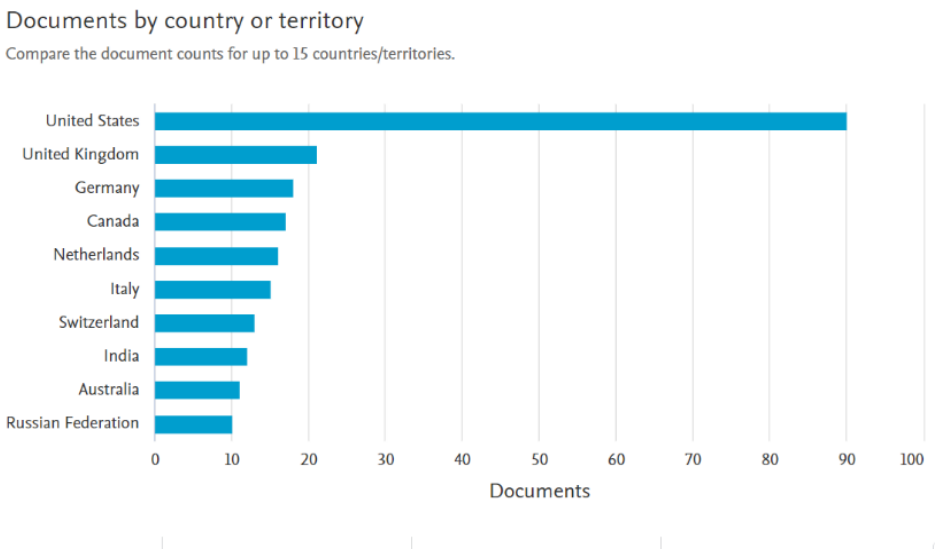


Figure 5. Infographics on Most Productive Countries Publishing PPP and R&D

Furthermore, Figure.6 illustrates that the author of Link, AN, is regarded as the most prolific author in Scopus for the theme of PPP and R&D (affiliated to the University of North Carolina) with five publications, followed by Spielman DJ (affiliated to the International Food Policy Research Institute) with four publications, Crusan J (affiliated with the National Aeronautics and Space Administration) and Scott JT (affiliated with the Department of Economics Dartmouth College) with three publications. In addition, Akinyede J, who is affiliated with the National Space Research and Development Agency with three publications, is ranked the fifth.

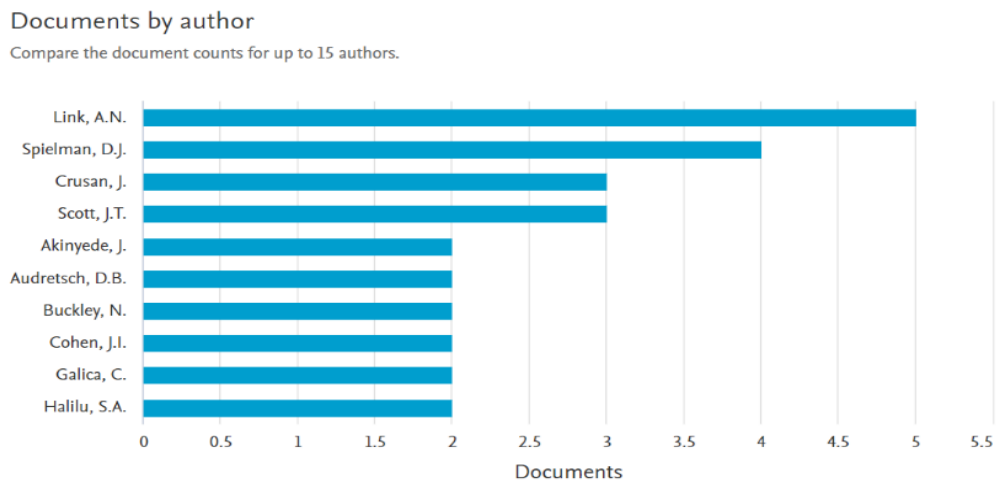


Figure 6. Publication Author Statistics with Scopus Indexed under PPP and R&D Themes

Figure.7 illustrates that the Indian Journals of Public Health Research and Development (Q4) and Science and Public Policy (Q1) become the platform to publish the most research results related to PPP and R&D themes between 1986 and 2020 with six publications. The trend is followed by Globalization and Health (Q1) in the third place with four publications. Dai is ranked fourth and fifth, with the American Journal of Agricultural Economics (Q1) and the Journal of Law Medicine and Ethics (Q2) with three publications.

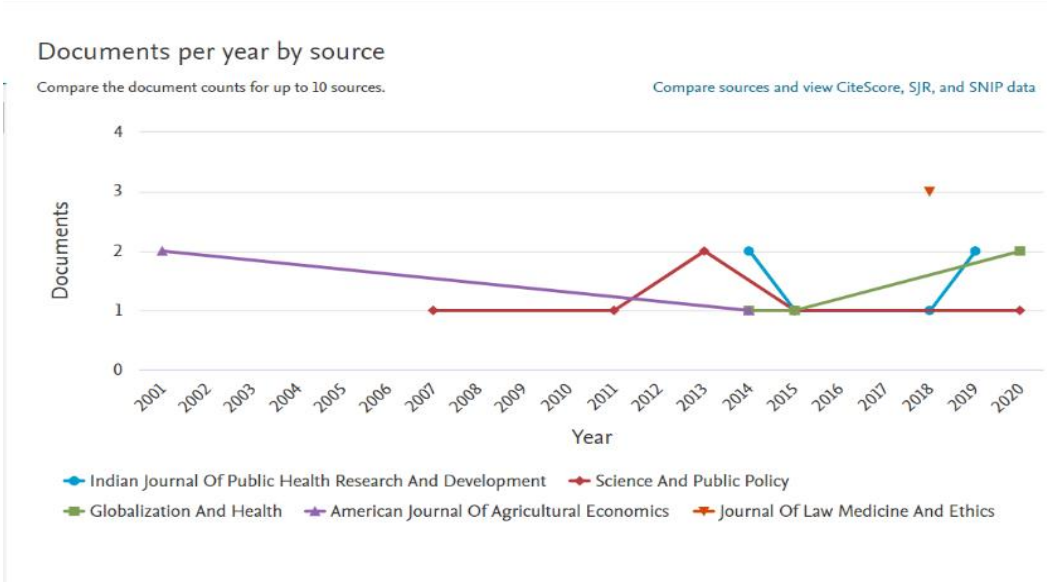


Figure 7. Source of PPP and R&D themes based on Number of Publications

From Figure 1 to Figure 7, it can be analyzed that the trend of PPP studies related to RnD issues is increasing. In general, PPP aims to provide infrastructure, but it is linked to RnD activities in this study. Out of the 263 documents filtered, Indonesia does not have Scopus indexed writings related to the issue of PPP and RnD, even though in implementation, there could be PPP mechanisms in R&D in Indonesia.

3.2 Bibliometric Visualization

Co-Authorship Country Visualization

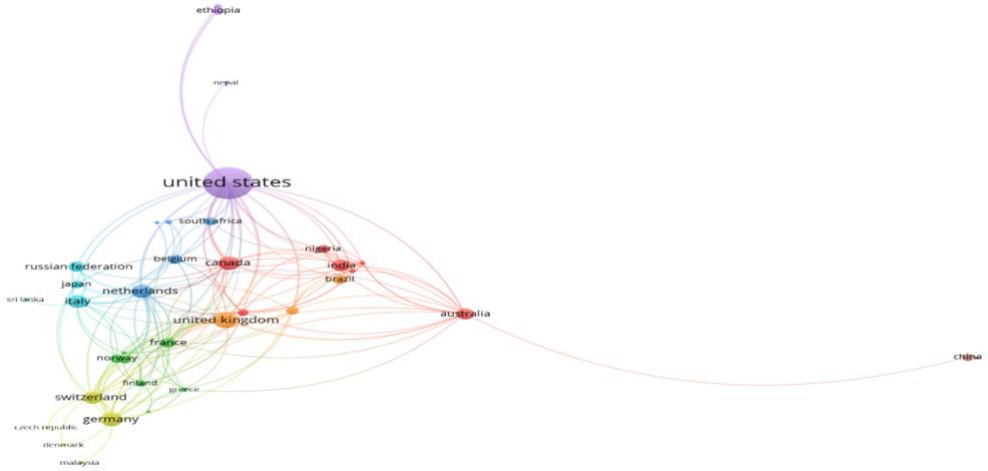


Figure 8. Author Network according to State Affiliation

Figure.8 illustrates a co-authorization network visualization based on countries, depicting a network of authors collaborating with other countries. VOSviewer provides an advantage to display relationships between articles and collaboration between authors. From the proliferated 736 authors across 54 countries, 8 clusters are formed indicated by similar color within the similar cluster. The bigger circle indicates the growing number of authors from a country collaborating with other countries, both within a similar cluster and outside the cluster. The figure also indicates that the United States has the most prominent visualization in terms of circle size compared to the others, signifying that the author from this country has strong links with other countries outside the cluster. Besides the US, other countries with strong links between fellow authors include the United Kingdom, Italy, Netherland, Switzerland, Germany, Canada, and Australia.

Keywords Visualization

This development map produces 699 keywords from the generated 263 articles based on the keywords. The next step is limiting keywords based on the repetition to filter the 70 keywords from 11 clusters. From this keyword information, the theme of each research area was filtered and identified. As illustrated in Figure. 9 and 10, this study presents the two different keyword network visualizations from VOSviewer: network visualization and overlay visualization.

Figure. 9 presents network visualization, where the keywords such as: 'public private partnership' and 'research and development' and 'innovation' have a larger circle compared to other keywords. A bigger frequency of the word occurrence leads to a bigger circle size of the nodes. Keywords with similar color indicate that they are within a similar cluster, narrowly related in terms of the keywords

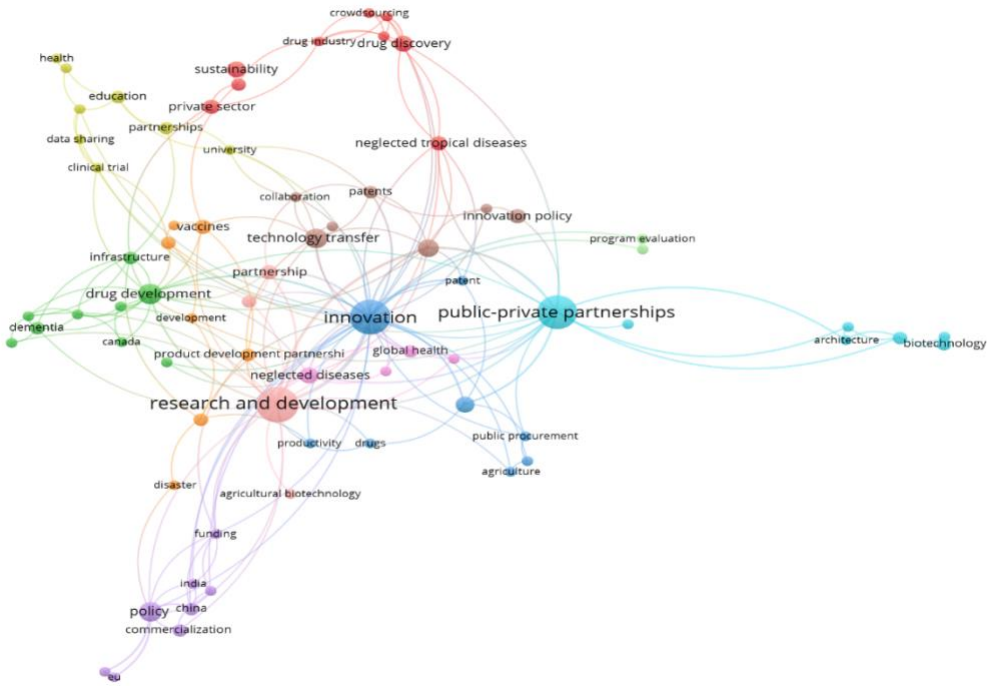


Figure 9. Network Visualization

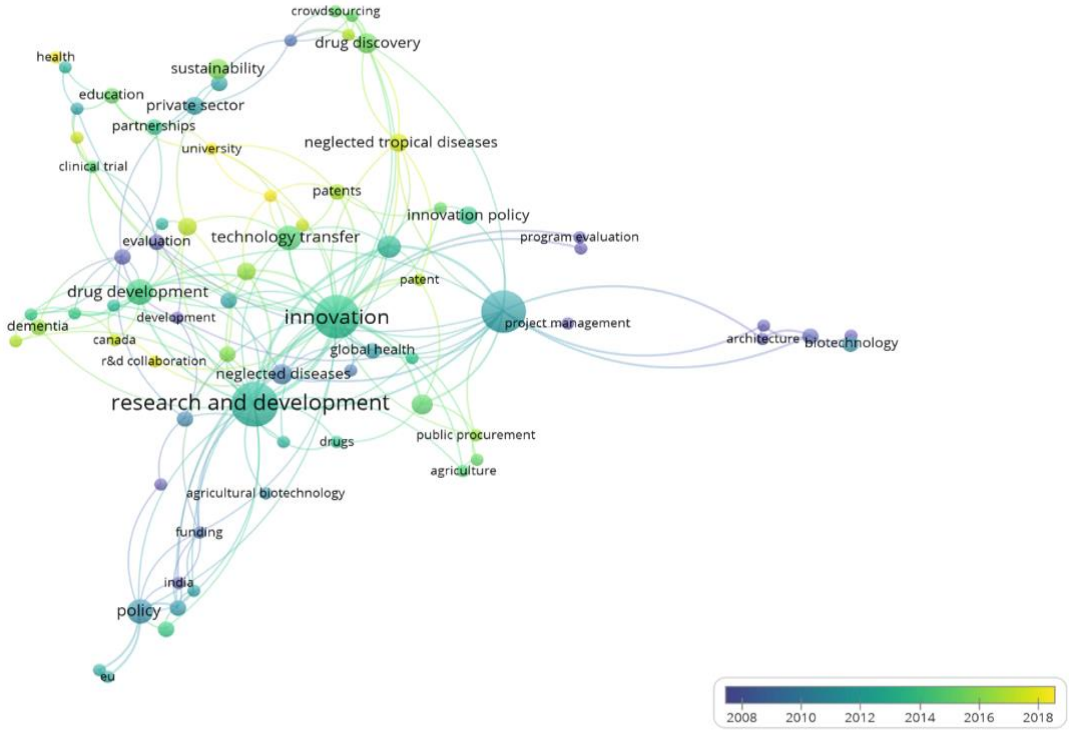


Figure 10. Overlay Visualization

Overlay Analysis provides a visualization of trends from year to year (see **Figure 10**). The keywords that appear under 2010 are infrastructure, development, evaluation. Meanwhile, the keywords that appear in the latest research around 2018 present areas include neglected tropical disease, health, vaccines, and university-industry collaboration.

Table 1. Clusters of co-occurring keywords

Cluster	Keywords
1	cost-benefit analysis, crowdsourcing, drug discovery, drug industry, neglected tropical, disease, open science, pharmaceutical research, private sector, sustainability
2	china, commercialization, disaster, funding, India, policy, research, technology
3	clinical trial, data sharing, education, health, industry, partnership, personalized medicine, university
4	agriculture, drugs, innovation, patent, pharmaceutical industry, productivity, public procurement, public sector
5	Alzheimer's disease, biomarkers, Canada, dementia, drug development, infrastructure, R&D collaboration, treatment
6	agricultural research and development, architecture, biotechnology, design, project management, public-private partnership, risk management
7	collaboration, globalization, innovation policy, intellectual property, partnership, research policy
8	development, evaluation, product development partnership, technology transfer, university-industry collaboration, vaccines, validation
9	developing countries, global health, neglected diseases, pharmaceutical firms
10	agricultural biotechnology, research, and development
11	program evaluation, small business

From the VOS viewer visualization in Figures 9 and 10, it can be summarized that the discussion about PPP in R&D began with the initiation of creating technological innovations through strengthening the resources in research and development through public/private partnerships. Discussions in the following years developed on the discourse of developing public/private partnerships in various sectors such as energy, agriculture, aeronautics and space agencies, infrastructure, transportation, and health. In the past few years, the health sector has indeed been the sector that has received the most attention and has become the subject of discussion on the topic of PPP in R&D. As seen from table 1, the frequency of keywords' occurrence is dominated by health sector topics. This finding is in accordance with the most cited articles written by Trouiller et al. (2002). Their research focuses on public-private partnerships as an effort to fill the gap in fulfilling health needs, especially in developing countries. Further, the study is devoted to developing infectious disease drugs that are 'not profitable' through the formation of collaboration between the private sector and the public sector.

3.3 Future Research Direction

Bibliometrics is effective for giving datasets, which researchers, policymakers, and other stakeholders can use to improve research quality and predict future research (Bayu et al., 2020). Of the 263 documents obtained related to PPP and R&D keywords, this paper selected ten main articles with the most citations to further study the future research agenda (Table 2).

Table 2. Future Research Direction

Article Title	Key Discourse	Future Research Direction/ Explanation
Innovation in the pharmaceutical industry: New estimates of R&D costs (DiMasi et al., 2016)	This article focus on the biopharmaceutical industry that independently finances R&D investment expenditures for the development of new drugs. This drug's development is also sponsored and funded by government and non-profit organizations (public-private partnerships devoted to developing medicines for neglected diseases).	Conducting advanced analysis of the productivity of biopharmaceutical R&D is essential.
Drug development for neglected diseases: A deficient market and a public-health policy failure (Trouiller et al., 2002)	The pharmaceutical industry considers that research and development for neglected diseases are too costly and risky, resulting in low returns. There are public-private initiatives to overcome this limitation through public-private partnerships and incentive packages.	The lack of drug research and development for "non-profitable" infectious diseases will require new strategies. Private-sector research obligations should be explored, and a public-sector not-for-profit research and development capacity should be promoted.
Critical success factors for PPP/PFI projects in the UK construction industry (Li et al., 2005)	PPP/PFI projects have been undertaken successfully in the UK's public facilities and services. The three most important critical success factors are 'a substantial and good private consortium', 'appropriate risk allocation', and 'available financial market.'	How to assess the commitment of both public and private participants to the success of a PPP/PFI project
The anatomy of medical research: US and international comparisons (Moses et al., 2015)	Advances in scientific discovery and service improvement have outpaced current financial capacities and organizational models to support the opportunities.	The United States needs to find new sources to support medical research.
The impact of firm participation in R&D programmes on R&D partnerships (Busom & Fernández-Ribas, 2008)	Public R&D programs trigger a behavioral change in firms' R&D partnerships, alleviating barriers to cooperation	Suppose public funding increases the development of partnerships. In that case, the output additionality generated by these partnerships has to be verified before concluding that public subsidies are the most efficient tool to reach the goal of increasing innovation. Another mechanism might prove to be more effective or at least complementary to subsidies.
Public-private partnership: From there to here (Croft, 2005)	Public-private partnerships for product development (PD PPP) can be an efficient model for bridging the translational research gap between basic research and clinical development by bringing together expertise from academia, the pharmaceutical industry, and the public sector. The sustainability of funding is a serious problem	Are PDPPPs a new model for producing drugs/treatments? Are PDPPPs achieving a public health impact?
BBMRI-ERIC as a resource for pharmaceutical and life science industries: The development of biobank-based Expert Centres (Van Ommen et al., 2015)	European Biobanking and BioMolecular resources Research Infrastructure-European Research Infrastructure Consortium (BBMRI-ERIC) aims to improve accessibility and interoperability between academic and industrial parties to benefit personalized medicine and disease prevention to promote the development of new diagnostics, devices, and medicines.	In the future, the academic-industry collaboration will have a central role in translating biobank data into actionable solutions. Neither of the parties will be able to do this on its own, as they separately are lacking the necessary combination of resources, expertise, and biological materials, and, perhaps even more important, the broad support of the research subjects
Effective antibacterials: At what cost? The economics of antibacterial resistance and its control (White et al., 2011)	The development and economic model of antibacterial use needs to be rebuilt based on health economic value through dialogue with the various stakeholders, including the pharmaceutical industry, and alternative incentives from 'push' to 'pull' and funding models, such as public/private partnerships	Society needs a research and development model that succeeds and delivers from start to finish and will ensure that antibacterials are available for future generations throughout their lifetime

Public/private partnerships: innovation strategies and policy alternatives (Link, 2006)	Public/private partnerships affect R&D activities and, thus, innovation. Innovation, in turn, leads to technological advancement, and technological advancement leads to economic growth. Thus, public/private partnerships encompass many policy alternatives that are part of a Nation's innovation strategy	R&D investments are a crucial indicator of advancements in science and technology. At the same time, this relationship between R&D and technological change is as important at the microeconomic level of firm behavior as it is at that macroeconomic level of economic growth.
Repairing the broken market for antibiotic innovation (Outterson et al., 2015)	Public-private partnerships have led to notable progress in drug development for infectious diseases.	Good public health practices curb inappropriate antibiotic use, making a return on investment challenging in payment systems based on sales volume

Note: The table shows the ten top-cited papers - provoking future research direction on the topics

The article above describes the practice of implementing PPP and R&D, where each discussion describes the problems and solutions. From the analysis of the ten most cited papers (from 263 documents), it can be concluded that the tendency of the PPP mechanism for R&D issue is mainly for the health sector, namely the pharmaceutical industry. The pharmaceutical sector expects funding for R&D activities to focus on developing drugs and vaccines, especially for diseases that do not potentially generate profits, such as infectious diseases in poor and developing countries. A financing strategy is needed to overcome the lack of R&D for 'neglected disease' drugs due to the high cost of clinical trials by supporting capital sources with the PPP scheme. Two examples of PPP that stand out in the development of antibiotics are BARDA in the US and ND4BB in the EU (Outterson et al., 2015). It can be concluded that a massive investment in financing is needed to develop biomedical innovations.

Conclusion

From the aforementioned results, it could be concluded that researches and studies conducted under the PPP and R&D themes firstly appeared in 1986. The R&D sector is acknowledged as a promising sector, indicating a growing demand by the government and business entities in developing PPP financing schemes. This conclusion is also evident from the statistical results of 263 articles from 1986 to 2020. That there has been an increasing trend of publication in the last ten years related to PPP in the R&D sector. In terms of affiliated countries, the United States, the United Kingdom, and Germany serve as the home countries that publish the most articles. Meanwhile, the most productive authors are Albert N.Link from the University of North Carolina (USA), David J. Spielman from the International Food Policy Research Institute (USA), and Jason Crusan from Advanced Exploration Systems Division-NASA (USA). Based on the top five ranks in the category of publication sources, there are two journals published by Oxford University publishers, which include: Science and Public policy and the American journal of agriculture economics. Other journals include the Indian Journal of Public health research and Development from RK Sharma Institute of Medico-Legal Publications, Globalization and health journal from publisher BioMed Central Ltd., and Journal of law medicine and ethics from SAGE Publications Inc. Furthermore, the most discussed PPP topics in Research and Development include innovation, research, and development, public-private partnerships, drug development, innovation policy, drug discovery, neglected tropical disease, global health, biotechnology, vaccines, and clinical trials. From the keyword analysis, it is revealed that most of the research areas on this topic focused on the health sector.

To sum up, this paper uses a systematic review through structured search and literature analysis, and the process is transparent and reproducible. This research focuses on the context of PPP and R&D activities (not only related to building research infrastructure). As seen in Scopus metadata, Indonesia does not have any publications or literature about this issue; therefore, it is necessary to encourage publication based on the best practice or ideal PPP implementation planning in Indonesia. This paper also summarizes some future research directions and gives a recommendation. The recommendation is to make a mechanism for how PPP funding can be carried out in R&D activities. The PPP funding is not only meant for infrastructure development but also for R&D activities (including Clinical Trials and Product Feasibility Tests which generally require substantial funding). In addition, a study is needed to see the PPP concept of costs and benefits in R&D in Indonesia.

References

Al-sharif, F., & Kaka, A. (2004). Pfi / Ppp Topic Coverage in Construction. *20th Annual ARCOM Conference*, *1*(September), 1–3.

Bayu, A., Nandiyanto, D., Biddinika, M. K., & Triawan, F. (2020). Indonesian Journal of Science & Technology How Bibliographic Dataset Portrays D ecreasing N umber of S cientific P ublication from Indonesia. *Indonesian Journal of Science & Technology*, *5*(1), 154–175.

Bonfim, L. R. C., Segatto, A. P., & Gonçalves, S. A. (2018). A conical-helix model of technology transfer and public-private partnerships for technological development in Brazilian public health. *Technology in Society*. https://doi.org/10.1016/j.techsoc.2018.01.006

Busom, I., & Fernández-Ribas, A. (2008). The impact of firm participation in R&D programmes on R&D partnerships. *Research Policy*, *37*(2), 240–257. https://doi.org/10.1016/j.respol.2007.11.002

Chen, C. (2017). Science Mapping: A Systematic Review of the Literature. *Journal of Data and Information Science*. https://doi.org/10.1515/jdis-2017-0006

Chen, C., Dubin, R., & Kim, M. C. (2014). Emerging trends and new developments in regenerative medicine: A scientometric update (2000-2014). In *Expert Opinion on Biological Therapy*. https://doi.org/10.1517/14712598.2014.920813

Croft, S. L. (2005). Public-private partnership: From there to here. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, *99*(SUPPL. 1), 9–14. https://doi.org/10.1016/j.trstmh.2005.06.008

DiMasi, J. A., Grabowski, H. G., & Hansen, R. W. (2016). Innovation in the pharmaceutical industry: New estimates of R&D costs. *Journal of Health Economics*, *47*, 20–33. https://doi.org/10.1016/j.jhealeco.2016.01.012

Eck, N. J. Van, & Waltman, L. (2016). Text Mining and Visualization. *Text Mining and Visualization*, 1–5. https://doi.org/10.1201/b19007

Ellegaard, O., & Wallin, J. A. (2015). The bibliometric analysis of scholarly production: How great is the impact? *Scientometrics*. https://doi.org/10.1007/s11192-015-1645-z

Glänzel, W. (2003). Bibliometrics as a research field: A course on Theory and Application of Bibliometric Indicators. In *Researchgate*.

Helby Petersen, O. (2019). EVALUATING THE COSTS, QUALITY, AND VALUE FOR MONEY OF INFRASTRUCTURE PUBLIC-PRIVATE PARTNERSHIPS: A SYSTEMATIC LITERATURE REVIEW. *Annals of Public and Cooperative Economics*. https://doi.org/10.1111/apce.12243

Ibrahim, C. (2020). *TREN KEPENULISAN PUBLIKASI PENELITIAN INDONESIA TEINDEKS PADA*. *April*. https://doi.org/10.33505/jodis.v3i1.50

Ke, Y., Wang, S., Chan, A. P., & Cheung, E. (2009). Research Trend of Public-Private Partnership in Construction Journals. *Journal of Construction Engineering and Management*. https://doi.org/10.1061/(asce)0733-9364(2009)135:10(1076)

Leydesdorff, L., & Rafols, I. (2012). Interactive overlays: A new method for generating global journal maps from Web-of-Science data. *Journal of Informetrics*. https://doi.org/10.1016/j.joi.2011.11.003

Li, B., Akintoye, A., Edwards, P. J., & Hardcastle, C. (2005). Critical success factors for PPP/PFI projects in the UK construction industry. *Construction Management and Economics*, *23*(5), 459–471. https://doi.org/10.1080/01446190500041537

Link, A. N. (2006). Public/private partnerships: Innovation strategies and policy alternatives. In *Public/Private Partnerships: Innovation Strategies and Policy Alternatives*. https://doi.org/10.1007/0-387-29775-8

Mandasari, V., & Wahyuni, E. T. (2019). Infrastructure Development by Public-Private Partnership in Indonesia: A Systematic Literature Review. *CSID Journal of Infrastructure Development*, *2*(2), 153. https://doi.org/10.32783/csid-jid.v2i2.90

Measuring Scholarly Impact. (2014). In *Measuring Scholarly Impact*. https://doi.org/10.1007/978-3-319-10377-8

Moses, H., Matheson, D. H. M., Cairns-Smith, S., George, B. P., Palisch, C., & Dorsey, E. R. (2015). The anatomy of medical research US and international comparisons. *JAMA - Journal of the American Medical Association*, *313*(2), 174–189. https://doi.org/10.1001/jama.2014.15939

OECD. (2016). Strategic public/private partnerships in science, technology and innovation Rationale. *OECD Science, Technology and Innovation Outlook 2016*.

Outterson, K., Powers, J. H., Daniel, G. W., & McClellan, M. B. (2015). Repairing the broken market for antibiotic innovation. *Health Affairs*, *34*(2), 277–285. https://doi.org/10.1377/hlthaff.2014.1003

Permana, C. T., & Harsanto, B. (2020). Sustainable City Planning Concepts and Practices in Emerging Economies: A Systematic Review. *The Journal of Indonesia Sustainable Development Planning*, *1*(1), 67–82. https://doi.org/10.46456/jisdep.v1i1.32

Reitz, J. M. (2004). *Dictionary for Library and Information Science*. Libraries Unlimited.

Robertson, G. E., & Allen, D. N. (1986). From kites to computers: Pennsylvania's Ben Franklin partnership. *Technovation*. https://doi.org/10.1016/0166-4972(86)90021-0

Rossi, M., & Civitillo, R. (2014). Public Private Partnerships: A General Overview in Italy. *Procedia - Social and Behavioral Sciences*. https://doi.org/10.1016/j.sbspro.2013.12.434

Trouiller, P., Olliaro, P., Torreele, E., Orbinski, J., Laing, R., & Ford, N. (2002). Drug development for neglected diseases: A deficient market and a public-health policy failure. *Lancet*. https://doi.org/10.1016/S0140-6736(02)09096-7

Tsai, H. H. (2011). Research trends analysis by comparing data mining and customer relationship management through bibliometric methodology. *Scientometrics*, *87*(3), 425–450. https://doi.org/10.1007/s11192-011-0353-6

Tsai, H. H. (2015). The research trends forecasted by bibliometric methodology: a case study in e-commerce from 1996 to July 2015. *Scientometrics*, *105*(2), 1079–1089. https://doi.org/10.1007/s11192-015-1719-y

Tsai, H. H., & Yang, J. M. (2010). Analysis of knowledge management trend by bibliometric approach. *World Academy of Science, Engineering and Technology*, *62*(2), 174–178.

Van Ommen, G. J. B., Törnwall, O., Bréchot, C., Dagher, G., Galli, J., Hveem, K., Landegren, U., Luchinat, C., Metspalu, A., Nilsson, C., Solesvik, O. V., Perola, M., Litton, J. E., & Zatloukal, K. (2015). BBMRI-ERIC as a resource for pharmaceutical and life science industries: The development of biobank-based Expert Centres. *European Journal of Human Genetics*, *23*(7), 893–900. https://doi.org/10.1038/ejhg.2014.235

Waltman, L., & Noyons, E. (2018). Bibliometrics for Research Management and Research Evaluation A Brief Introduction. *Bibliometrics for Research Management and Research Evaluation:A Brief Introduction*.

White, A. R., Blaser, M., Carrs, O., Cassell, G., Fishman, N., Guidos, R., Levy, S., Powers, J., Norrby, R., Tillotson, G., Davies, R., Projan, S., Dawson, M., Monnet, D., Keogh-brown, M., Hand, K., Garner, S., Findlay, D., Morel, C., … White, T. (2011). Effective antibacterials: At what cost? The economics of antibacterial resistance and its control. *Journal of Antimicrobial Chemotherapy*, *66*(9), 1948–1953. https://doi.org/10.1093/jac/dkr260

Xiao, Y., & Watson, M. (2019). Guidance on Conducting a Systematic Literature Review. In *Journal of Planning Education and Research*. https://doi.org/10.1177/0739456X17723971

Yana, Nikonova, I. (2014). PUBLIC-PRIVATE PARTNERSHIP AS A TOOL FOR FUNDING FOR THE STRATEGY OF INNOVATIVE DEVELOPMENT OF RUSSIA. *TOMSK STATE UNIVERSITY JOURNAL*, *387*, 180–186. https://doi.org/10.17223/15617793/387/28

Zhang, X. (2005). Critical Success Factors for Public–Private Partnerships in Infrastructure Development. *Journal of Construction Engineering and Management*. https://doi.org/10.1061/(asce)0733-9364(2005)131:1(3)

Vol. 2 No. 1- April 2021

E-ISSN: 2722-0842 | P-ISSN: 2721-8309

Available online at
http://journal.pusbindiklatren.bappenas.go.id/

Research Paper

When Will Human Capital in Indonesia be Equal? A Convergence Analysis

Nayaka Artha Wicesa[1*], Axellina Muara Setyanti[2]

Department of Economics, Faculty of Economics and Business
University of Brawijaya, Malang, Indonesia.[1,2]
Email: [1]nayakaarthawicesa@ub.ac.id, [2]axellinamuara@ub.ac.id.

*[*)] **Corresponding author***

ABSTRACT

One of the problems faced by developing countries is income inequality, which is caused by weak and uneven human capital between regions. This research aims to determine the convergence of human capital in absolute and conditional with the explanatory variable of government expenditure in education. The method used is panel data regression with generalized least square and robust standard error. The results showed that provinces in Indonesia experienced human capital convergence in absolute, where inequality of human capital among provinces tended to decline over time and towards equity. The results also showed that provinces in Indonesia experienced human capital convergence in conditional, where government expenditure in education was able to accelerate the convergence process, but not significantly. This study also found that the time needed to equalize human capital in Indonesia is 164 years.

Keywords: human capital, government expenditures in education, convergence analysis

ARTICLE INFO

Received: November 14, 2020
Received in revised form: March 16, 2021
Accepted: March 28, 2021

doi:10.46456/jisdep.v2i1.94

JISDeP - The Journal of Indonesia Sustainable Development Planning
Published by Centre for Planners' Development, Education, and Training (Pusbindiklatren),
Ministry of National Development Planning/ National Development Planning Agency (Bappenas), Republic of Indonesia

Address: Jalan Proklamasi 70, Central Jakarta, Indonesia 10320
Phone:+622131928280/31928285
Fax:+622131928281
E-mail:
journal.pusbindiklatren@bappenas.go.id

Supported by Indonesian Development Planners Association (PPPI)

1. Introduction

There is so much empirical evidence that finds the important role of human capital in the economic development of a country. Benhabib and Spiegel (1994) found that the level of the human capital of a country positively affects the level of productivity. Human resources are an important factor that a country should develop because the existence of quality human resources will increase productivity which has implications for economic development. The reciprocal relationship between economic growth and human capital growth is an important key to sustainable economic growth (Gillies, 2017; Islam et al., 2016; Mincer, 1995).

Human capital is a term often used by economists to refer to education, health, and other human capacities which, if improved, can increase productivity (Todaro & Smith, 2011). Becker (2002) defines human capital as the knowledge, information, ideas, skills, and health of an individual. Meanwhile, according to Acemoglu & Autor (2005), human capital is defined as things related to workers' knowledge or characteristics, either innate or acquired, which will later contribute to productivity.

To date, there is no generally accepted agreement regarding what indicators are used to measure human capital, so any research that uses human capital will vary widely in how it is measured. Throughout existing scientific writings, the majority of definitions of human capital tend to be proxied from education.

The formation of human capital can be sourced from education (Colantonio et al., 2010). One problem with the measurement of human capital is that schools are often perceived as the only source of human capital and skills (Bloom et al., 2004). However, Hanushek (2013) explained that with regard to human resources, the measurement of education quality is not limited to school attainment but also cognitive skills. Without improving the quality of schools, developing countries will find it challenging to improve their long-term economic performance.

Indonesia has reformed the relationship between the central and regional governments by decentralizing most government functions to regional governments since 1999. As a consequence, the education sector has become one of the basic service sectors that have undergone fundamental changes, both in terms of the bureaucracy of the authority to provide education and the aspect of funding. (Subijanto, 2010). Along with decentralization, the quality of human resources in a region becomes the responsibility of the region itself. There are a number of budgets that flow massively from the central government to local governments. As a result, the subjects and objects of development are closer to the local governments who have discretionary authority to manage the budget. Therefore, regional development can be maximally optimized for the benefit of many people in the region. This is because the purpose of decentralization itself is to make decisions that are closer to the community so as to produce programs and services that better meet the needs of local communities (Channa & Faguet, 2016; Work, 2002).

Public spending, including local government, will achieve much better output if distributed and allocated to specific components, such as investment spending. This is because government spending in a broad sense does not actually generate economic growth Purnastuti & Suprayitno, (2016). The greater the investment made by the government, the higher the growth that will be achieved. In its development, human capital investment is an important expenditure because it aims to improve the quality of human resources itself. Given the fact that human resources are the main production factor in generating output at the micro and macro levels, this investment is worth making, although the benefits are not short-term.

However, it cannot be denied that development in Indonesia is still Java-centric. In 2019, Java Island contributed 59% to Indonesia's Gross Regional Domestic Product, equivalent to IDR 9487 trillion. The second-largest contributor is Sumatra Island (21,3%), with a GDP of 3427 Trillion Rupiah. While the rest is distributed on Kalimantan Island (8,1%), Sulawesi Island (6,3%), Bali and Nusa Tenggara Island (3,1%), and Maluku and Papua (2,2%) (BPS, 2019a). Also, in 2019, human development achievements at the provincial level in Indonesia varied considerably. HDI at the provincial level ranges from 60,84 (Papua) to 80,76 (DKI Jakarta) (BPS, 2020). Indonesia's development is expected to be more than development centered on Java or Sumatra but evenly distributed throughout the region. A regional level analysis is important to study the conditions of inequality in human resource development related to decentralization, whether it is increasingly converging or divergent. The regional/provincial approach is considered to be better at capturing differences in human resources quality than the national approach, especially when convergence analysis is employed (Gennaioli et al., 2013; Zhang et al., 2019).

This study uses convergence analysis to see the development direction of the human capital gap at the provincial level in Indonesia. Particular attention is given to local government spending that supports the human capital formation, the education budget. Through the measurement of convergence, it can be

seen that there is a tendency to narrow economic disparities between regions within a certain period (Sala-i-Martin, 1996). Satriotomo (2003) also explains that in convergence theory, the level of prosperity experienced by developed regions and developing regions will one day meet at one point. Economics also states that there will be a catching-up effect when developing countries catch up with developed countries. This catching-up effect process is also known as the convergence process. So, the objectives of this study are 1) to find out whether the provinces in Indonesia experience absolute convergence of human capital; 2) to learn whether the provinces in Indonesia experience convergence of human capital conditionally with explanatory variable, government spending on education.

Literature Review

From a normative point of view, Oates (2005) states that the diversity of preferences between regions is the most fundamental reason that the government structure shifts towards decentralization. This view was later called the "Decentralization Theorem." Previously, Oates (1993) also states that there must be strong reasons to formulate policies for the provision of infrastructure and human resources. However, government policies are sensitive to regional conditions, so to be more effective in promoting economic development, the policies should be locally determined to match with the geographical needs (Busemeyer, 2008; Esteller & Solé, 2005).

One type of decentralization that is closely related to education is fiscal decentralization. When decentralization is followed by the term fiscal, it refers to "budget practices" and "reallocation of resources" to local governments to improve quality and effectiveness in carrying out government tasks while expanding the authority and capacity of government at the local level (Ocheni & Agba, 2018; Work, 2002). So, in the context of education, fiscal decentralization is an effort to give wider authority to regions to make breakthroughs in education implementation (Musanna & Bahri, 2011). Burki stated in Subijanto (2010) that conceptually there are two types of decentralization in terms of education. First is the decentralization of authority in the education sector in terms of education policies and aspects of funding from the central government to local governments (provincial, district, or city). Second is the decentralization of education with a focus on granting greater authority at the school level. The first concept of education decentralization is mainly related to regional autonomy and decentralization of governance from the capital to provinces. In contrast, the concept of decentralization of education which focuses on granting greater authority at the school level is carried out with the motivation to improve the quality of education outcomes.

In Indonesia, human resource convergence in an earlier study conducted by Anwar (2018) is determined by several factors such as socio-economic conditions and access to regional infrastructure. In the first period (2004-2010), human resource convergence in Indonesia was determined by economic growth, poverty, illiteracy, access to clean water, sanitation, the number of health centers and universities. However, in the second period (2010-2016), the convergence was influenced by economic growth, poverty, and access to sanitation. In most studies on human capital, it is shown that education, wages, health, experience, social development are perfectly associated with human capital development (Islam et al., 2016).

According to human capital theory, education plays a vital role in driving economic growth. The better the investment that individuals make in education, the better they will be and the economic outcomes they will get (Gillies, 2017). The latest study by Nurarifin and Ridena (2020) shows that human capital positively affects Indonesia’s per capita income, but the magnitude is relatively small. Thus, it is very important to study human capital in Indonesia. Recently, the definition of human capital has broadened to include not only knowledge or skills but also competencies, traits, and attitudes such as reliability, honesty, independence, and individual responsibility (Becker b, 2002).

2. Methodology

This study uses a quantitative approach using secondary data taken from the Ministry of Finance's General Directorate of Fiscal Balance (*Direktorat Jenderal Perimbangan Keuangan* - DJPK) and the Central Statistics Agency. The population in this study is Indonesia's territory, with a sample of 33 provinces during the period 2005–2019. The variables used in this study consisted of the independent variable, the human capital index and government spending in education, and the dependent variable, the growth of the human capital index.

Operational Definition of Variables

The operational definitions of the research variables are as follows:

1. Government Expenditure on Education is defined as the amount of government spending by function on education (Lucas & Shobayo, 2017).
2. Human Capital Index growth is defined as the percentage change in the index in year t and year t-1.
3. The Human Capital Index is defined as a measure that describes the knowledge, information, ideas, and expertise of an individual, all of which can be obtained through formal education. Thus, several previous researchers proxied human capital using school enrollment rates (Altiner & Toktas, 2017; Barro, 2001; Hanushek, 2013; Mankiw et al., 1992; Murthy, 1997). The Human Capital Index in this study was formed using the method developed by the World Economic Forum (2017), which the authors further modify as follows.

Human Capital Composite Index

The formulation of the human capital composite index was adopted from the formulation of the human development index used by UNDP (2016). The formula is as follows :

$$HCI = w_1 * DI_1 + w_2 * DI_2 + \ldots + w_n * DI_n$$

HCI is the human capital index, w is the weight of dimension index, DI is dimension index, and n is the number of dimensions. Dimension index is an index that shows the value of each dimension based on a predetermined weight. Dimensions are components of the composite index.

Table 1. Human Capital Index Structure

	Dimensions (weight)	The Operational Definition of the Dimensions
Human Capital Index	Elementary School Education Participation Rate (25%)	The percentage of population members between 7 and 12 years old who are currently attending elementary school
	Junior High School Education Participation Rate (25%)	The percentage of population members between 13 and 15 years old who are currently attending junior high school
	Senior and Vocational Junior High School Education Participation Rate (25%)	The percentage of population members between 16 and 18 years old who are currently attending senior and vocational high school
	Higher Education Participation Rate (25%)	The percentage of population members between 19 and 24 years old who are currently attending higher education

Source: World Economic Forum (2017), modified

Dimensional Index Calculation Method

The formula for calculating the dimensional index is as follows:

$$Dimensional\ Index = \frac{(Actual\ Value - Minimum\ Value)}{(Maximum\ Value - Minimum\ Value)}$$

The minimum value is the lowest value of all data observed during the observation period. The maximum value is the highest value of all observed data during the observation period. As a result, the index will have the highest value of 1 and the lowest value of 0. The minimum and maximum values will differ from year to year.

Panel Data Analysis: Absolute and Conditional Convergence

There are several methods used in estimating the panel data regression model, namely *Common Effect*, *Fixed Effect*, and *Random Effect*. *Common Effect* is a model that cannot distinguish the variance between cross places and points in time because it has a fixed intercept and does not vary randomly. *Fixed Effect* is a model that assumes that the intercept is different for each subject while the slope remains the same between subjects. *Random Effect* is a model in which the residual variable is thought to have a relationship between time and between subjects. To select the best model from the three models, the Chow, Hausman, and Lagrange multiplier tests were carried out. The model to be estimated in this study adopts the model developed by Barro & Sala-i-Martin (1991) as follows.

Model 1: Absolute Convergence

$$\Delta HCI_{it} = \beta_0 + \beta_1 Ln\_HCI_{it-1} + \mu_{it}$$

where:

ΔHCI	: Human Capital Index Growth (%)
β_0	: Constant
β_1	: Convergence Coefficient
Ln_HCI_{t-1}	: Natural Logarithm of Human Capital Index Early Years of Analysis
μ	: Error Term
i	: Province
t	: Year

Model 2: Conditional Convergence

$$\Delta HCI_{it} = \theta_0 + \theta_1 Ln\_HCI_{it-1} + \theta_2 Ln\_GEE_{it} + \varepsilon_{it}$$

Dimana:

ΔHCI	: Human Capital Index Growth (%)
θ_0	: Constant
θ_1	: Convergence Coefficient
θ_2	: Coefficient of Variable Affecting Conditional Convergence
Ln_HCI_{t-1}	: Natural Logarithm of Human Capital Index Early Years of Analysis
Ln_GEE	: Natural Logarithm of Government Expenditure in Education
ε	: Error Term
i	: Province
t	: Year

Convergence Coefficient β_1 dan θ_1 are units that can be used to calculate the speed of convergence. If β_1, $\theta_1 < 0$, convergence occurs, and if β_1, $\theta_1 > 0$, divergence occurs. Perfect convergence is reached if β_1, $\theta_1 = -1$ and perfect divergence is reached if β_1, $\theta_1 = 1$. The speed of convergence (λ) of a region can be calculated using the following formulas:

$$\lambda = -\frac{[\ln(\beta_1 + 1)]}{T} \qquad \lambda = -\frac{[\ln(\theta_1 + 1)]}{T}$$

T is the number of observation years. By using the value of each coefficient of convergence, the half-life of convergence (h), i.e., the time required to close a half of the inequality, can be calculated using the following formula:

$$h = \frac{\ln(2)}{\lambda}$$

3. Results and Discussion

Community participation in education is the initial process of forming human capital. The formation of human capital is important for a country because the knowledge and skills in humans will directly increase their productivity and indirectly increase the ability to develop and adopt new technologies (de la Fuente, 2011).

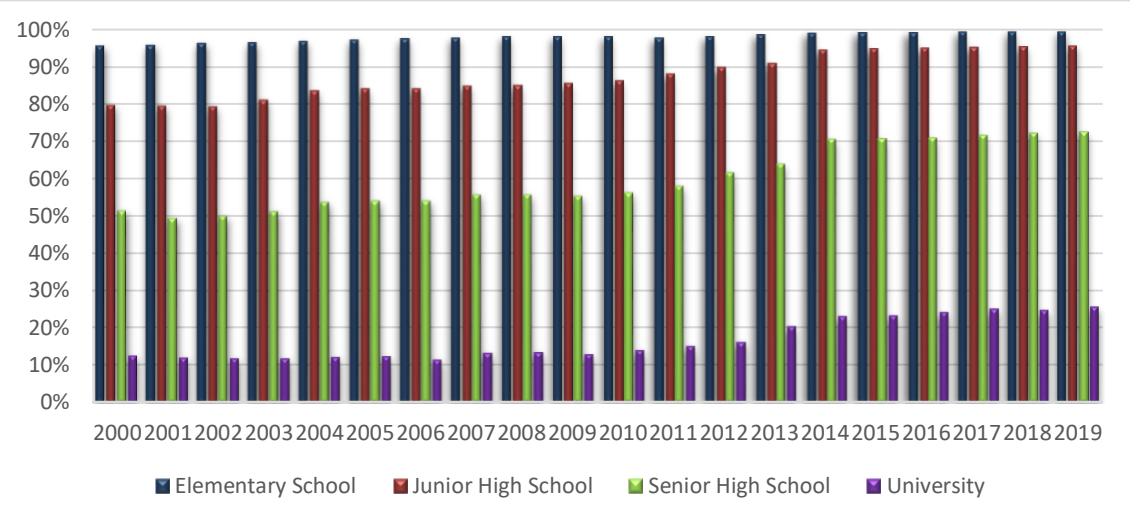


Figure 1. School Enrollment Rates in Indonesia, 2000 – 2019

Source: BPS, 2020 (compiled by the author)

The level of community participation in education and the formation of human capital is quite widely measured by the School Participation Rate (Gillies, 2017; Zhang et al., 2019). One indicator that can be used to observe the success of the Education Development Program, the certainty of getting an education or equal distribution of education services at the national, provincial, and municipal levels, is through the Gross Participation Rate and Pure Participation Rate at various levels of education (Ministry of Education, 2019). The School Enrollment Rate in Indonesia can be seen in Figure 1.

In general, it can be seen that the School Participation Rate at each level of education continues to increase from year to year. This means that the number of people who receive education according to school-age ranges has increased. However, between education levels, there is still quite a gap. On a national average during the period 2000-2019, the School Participation Rate for Elementary School was 97,76%, Junior High School was 87,53%, then decreased at the Senior High School and University levels with a School Participation Rate of 59,77% and 16%, respectively. School Participation Rate in higher education is still very low. Only 1 in 6 of the population aged 19-24 years is able to access education at higher education. A greater number of participation rates at one level of education indicates the quality of government services to the right of the community to gain access to education. The amount of the participation rate also shows that the community has easy access to leap into another level (Wahyudin & Caturwati, 2019). Thus, the low percentage of higher education indicates difficulties for the community in accessing it. Provinces with the highest participation rates were DI Yogyakarta, Aceh, and Maluku, while the lowest was Papua, West Sulawesi, and the Bangka Belitung Islands. Compared to several ASEAN countries, Indonesia's Higher Education Gross Enrollment Rate is still behind compared to Singapore's 78% and Malaysia's 38%. Higher education is the key to a country's progress in achieving prosperity through adaptation and innovation (Ministry of Finance, 2018). The backward development of higher education is caused by the priority of new education development from the 9-year compulsory education to the 12-year compulsory education. As the results, the Gross Enrollment Rate and Net Enrollment Rate for Basic Education reach more than 95%, while Higher Education is still far below it.

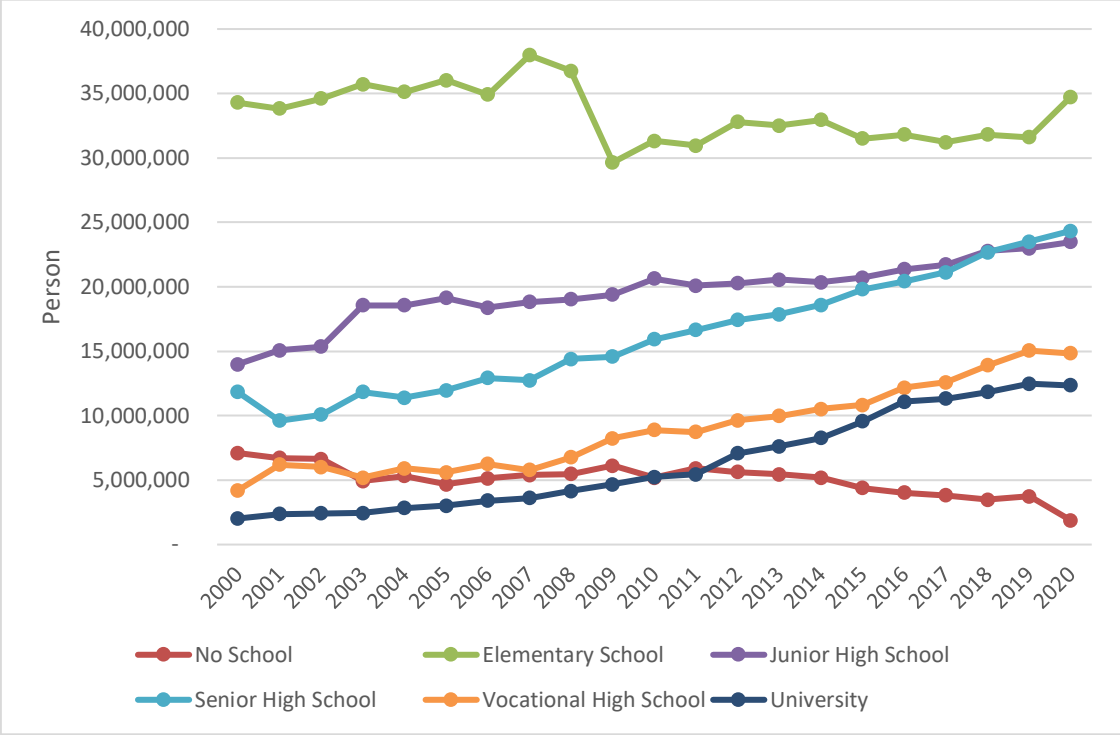


Figure 2. Number of Workers in Indonesia Based on the Highest Enrolled Education, 2000 - 2020
Source: BPS, 2021 (compiled by author)

The condition of school participation in Indonesia will impact the quality of the workforce. Figure 2 shows that elementary school graduates still dominated the workforce in Indonesia, followed by junior high school, high school, vocational high school, and university graduates, while the number of workers who never went to school was the least and decreasing. This shows that the compulsory education program has been implemented properly by the government. Then, there is a trend towards improving the quality of the workforce in Indonesia, which is shown by the decreasing number of workers with primary education. The workforce with junior high school education also shows slower growth. On the other hand, the workforce with high school education shows a higher growth. Thus, the number of workers with junior and senior high school education is almost the same. It seems that this pattern will experience a shift in the next few years where the number of workers with high school education will outnumber those with junior high school education. Workforce with SMK education shows an upward trend with high growth, and tertiary education workers also show similar trends. However, looking at the distribution, the number of workers with tertiary education is still low compared to other levels of education.

Based on empirical studies in Indonesia, the implementation of decentralization has positive and negative impacts on the delivery of public services such as education (Purwanto & Pramusinto, 2018). Azzizah (2015) shows a substantial gap between eastern and western Indonesia. The increase in education expenditure in developed regions has an impact on increasing efficiency and accelerating economic growth. Unfortunately, this does not have a significant impact on increasing human capital and reducing poverty (Saraswati, 2012). The impact of decentralization on human capital in the regions can be observed from the following estimation results:

Table 2. Estimation Results of Absolute Convergence

Dependent Variable: ΔHCI						
Independent Variable	*Common Effect Model*		*Fixed Effect Model*		*Random Effect Model*	
	Coeff	Prob	Coeff	Prob	Coeff	Prob
C	0,3924***	0,000	0,4636***	0,000	0,3924***	0,000
Ln_HCI$_{t-1}$	-0,0870***	0,000	-0,1046***	0,000	-0,0870***	0,000
R-Squared	0,1039		0,0809		0,0809	
Prob (F-Stat)	0,0000		0,0000		0,0000	
Convergence / Divergence	Convergence Occurs		Convergence Occurs		Convergence Occurs	
Speed of Convergence (λ)	0,65%		0,79%		0,65%	
The Half-Life of Convergence	107 Years		88 Years		107 Years	
The Whole Life of Convergence	214 Years		176 Years		214 Years	

note : significance level ***1%, **5%, *10%

Source: Author (2020)

The Random Effect Model produced the best model. According to Gujarati and Porter (2015), if the method used is the Random Effect Model, it can ignore the problem of classical assumption violations because the REM method uses Generalized Least Square (GLS). Based on Table 2, the influence of the independent variable on the dependent variable can be seen in the individual significance test. The estimation results show that the Human Capital Index variable at the beginning of the analysis has a significant negative effect on the growth of the Human Capital Index at α = 1%. This means that provinces in Indonesia are experiencing absolute convergence of human capital at a rate of 0,65% per year. The Half-Life of Convergence and The Whole Life of Convergence are 107 years and 214 years, respectively. The coefficient of determination of 0,0809 means that the variation in the growth of the Human Capital Index can be explained by the model at 8,09%, and the remaining 91,91% is explained by other variables outside the model.

From the estimation results above, this study finds that human capital represented by the components of the School Participation Rate has converged, or in other words, even distribution is evident across regions. The estimation also found that to equalize human capital, especially education, takes a very long time, at 107 years, to close half of the initial gap and at 214 years, to close the entire gap. The zoning system and teacher rotation can be mentioned as government efforts to equalize the quality of education in Indonesia. Equity in the field of education is not only limited to the number of people who can attend school, but the quality of output resulting from the education process. The average length of schooling in Indonesia in 2019 is 8,75 years (BPS, 2019b). Even though it has met the Ministry of Education and Culture's Strategic Plan with the average target length of schooling at 8,7 years, this achievement is still equivalent to junior high school education.

Concerning the objectives of decentralization in education, two prerequisites must receive attention: delegation and facilitation (Jalil, 1999). Decentralization is not possible without the delegation of authority from the central government to local governments. The delegation has been implemented about two decades after decentralization, but facilitation is still required. Although the authority to handle the education sector has been partially delegated, the central government needs to provide support to the regions to be able to implement decentralization responsibly. However, with the limitations each region has, financing and the capacity of human resources to implement this policy tend to cause complications and lead to inefficiencies in education management (Musanna & Bahri, 2011). In the second objective of the research, we want to know the state of conditional convergence of human capital if government spending on education is used as an explanatory variable.

Table 3. Estimation Results of Conditional Convergence

Dependent Variable: ΔHCI						
Independent Variable	*Common Effect Model*		*Fixed Effect Model: Robust Standard Error*		*Random Effect Model*	
	Coeff	Prob	Coeff	Prob	Coeff	Prob
C	0,4861***	0,000	0,5183***	0,000	0,4861***	0,000
Ln_HCI$_{t-1}$	-0,0816***	0,000	-0,1040***	0,004	-0,0816***	0,000
Ln_GEE	-0,0042	0,108	-0,0020	0,463	-0,0042	0,107
R-Squared	0,1127		0,0848		0,0835	
Prob (F-Stat)	0,0000		0,0000		0,0000	
Convergence / Divergence	Convergence Occurs		Convergence Occurs		Convergence Occurs	
Speed of Convergence (λ)	0,65%		0,84%		0,65%	
The Half-Life of Convergence	106 Years		82 Years		106 Years	
The Whole Life of Convergence	212 Years		164 Years		212 Years	

note : significance level ***1%, **5%, *10%

Source: Author (2020)

To decide the best model, we used the Fixed Effect Model. The classical assumption test indicates that the model exceeds multicollinearity but does not pass heteroscedasticity and autocorrelation. Therefore, it is necessary to improve classic assumptions using the Robust Standard Error (Satria, 2018). Based on Table 3, the Human Capital Index variable at the beginning of the year of analysis has a significant negative effect on the growth of the Human Capital Index at α = 1%. This means that provinces in Indonesia are experiencing a convergence of human capital conditionally at a rate of 0,84% per year, whereas Government Expenditure influences the conditional convergence on education. The Half-Life of Convergence and The Whole Life of Convergence are 82 years and 164 years, respectively. The convergence speed has increased from 0,65% to 0,84%, so that the time needed to close half of the initial gap is faster, at 82 years, while the time needed to close the entire gap is 164 years.

As seen in the estimation results, government spending on education was able to accelerate the convergence process, but not significantly. This means that the amount of government spending so far has not succeeded in affecting the quality of human resources. The results of this study are in line with a study conducted by Bappenas (2019) which shows that at 20% of the state budget, the education budget has not been optimal and has not been included in the quality expenditure category. In realizing quality education, an adequate budget is needed to provide adequate human resources, organizational systems, infrastructure, and a conducive educational environment. Law Number 20 of 2003 concerning the National Education System states that the education budget is a minimum of 20% of the state budget and 20% of the regional budget, excluding teacher salaries and official education costs. This law also states that the central government and regional governments have the right to direct, guide, assist and supervise the delivery of education in accordance with the prevailing laws and regulations. Law Number 23 of 2014 also stipulates that education is included in Compulsory Government Affairs. Early childhood education and basic education (Elementary School and Junior High School) are the authority of the district municipal government, and secondary education (Senior High School and Vocational High School) is the provincial government's authority

One aspect that can show the output of government spending in education is the quality of educational infrastructure because the progress of a country to catch up with other countries is also very dependent on two other factors, the quality of institutions and the availability of infrastructure (Ministry of Finance, 2018). The 2019 Education Statistics shows that the main school infrastructure, such as classrooms, is still far from good. Classrooms for Elementary School level that are in good condition are only 24,57%, Junior High School 29,16%, Senior High School 43,01%, and Vocational High School 51,26% (BPS, 2019b). One of the most important aspects of the teaching and learning process is the availability of comfortable and safe learning facilities. School facilities and infrastructure must comply with predetermined educational quality standards and support a more conducive learning process. Unfortunately, the conditions of current classrooms are mostly damaged, either light, moderate, or completely damaged. Although efforts to improve the quality of school facilities and infrastructure have been rehabilitated or renovated by the Ministry of Education and Culture, the Ministry of Religion, and several other ministries, the government's ability to provide conducive classrooms to the teaching and learning process is not yet optimal (BPS, 2019b).

Providing adequate infrastructure for the education process requires adequate allocation of funds. The allocation of funds from the capital to the regions has been regulated through the provisions of the General Allocation Fund and Special Allocation Funds to the regions. Presidential Regulation Number 141 of 2018 concerning Technical Guidelines for Physical Special Allocation Funds explains that this fund can be used to help finance special regional physical activities in accordance with national priorities, which of course, include educational matters. These funds can be used for the rehabilitation and construction of classrooms, libraries, and laboratories to support a conducive learning situation to produce higher quality output.

In addition to the quality of infrastructure, other aspects can show the output of government spending on education. The quality of infrastructure in Indonesia is still far from good. However, it is feared that this situation will cause the government to focus only on physical expenditures, even though many other aspects must be considered, such as teacher quality, teacher welfare, curriculum design, equitable education, and the high cost of tertiary education. This study does not focus on all aspects. However, it only focuses on how government spending in education can create equity in human capital as human capital in this study is an index formed from the dimensions of school enrolment rates. The school enrolment rate in Indonesia has decreased with increasing levels of education. In other words, the higher the level of education, the lower the enrolment rate. This phenomenon does not only occur on a national scale but also in all provinces. Thus, all provinces can be said to have the same problems. The difference only lies in the depth of the problems each province face, which is measured by the amount of the Human Capital Index.

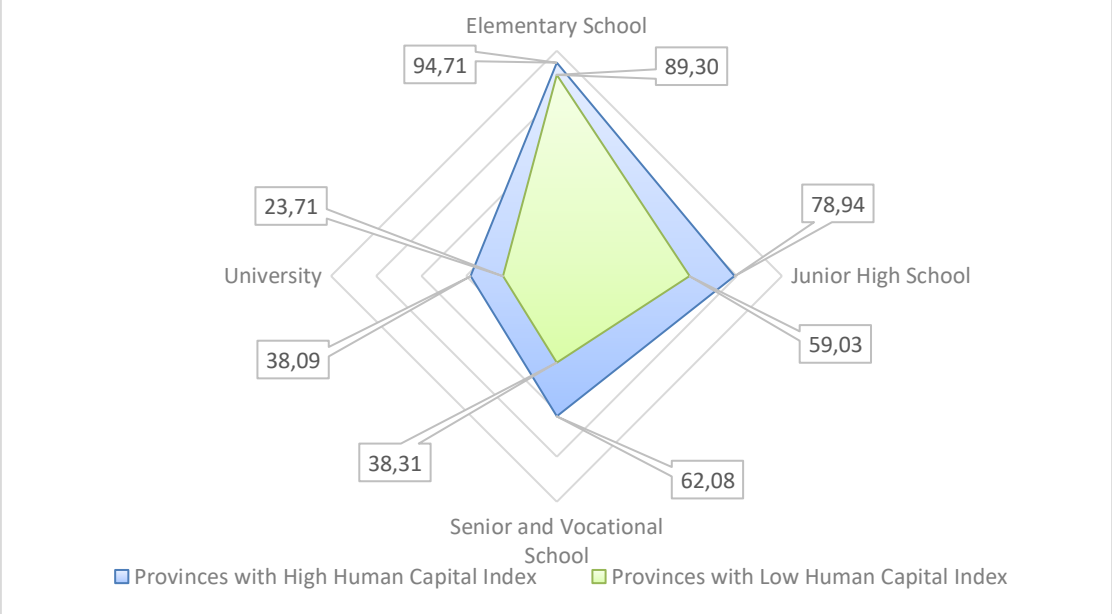


Figure 3.Gap of Provincial Human Capital Index in Indonesia by Dimensions, 2005 - 2019
Source: Author's calculation (2020)

The magnitude of the human capital inequality in Indonesia is shown in Figure 3. The inequality is quite large at the junior high school, senior and vocational high school, and university, while the inequality at the primary level is relatively small. The budget for education largely determines how this school enrollment rate can be increased. The priority for regional funding allocation depends on the local government and the regional people's representative assembly. Since the education sector is one of the basic service sectors, there is a need for a minimum standard of education that regions must achieve as a reference in planning the education sector. The most important question regarding the direction of education decentralization is how schools as implementers of the education process have the autonomy to determine various policies regarding the organization and teaching-learning process, teacher management, planning at the school level, and sources of school funding. Thus, government spending on education should ideally not only increase in quantity from year to year, but also in quality.

Some empirical results have shown that simply providing more resources to schools is generally ineffective. Local governments should be able to optimize funds for education to increase access and expand learning opportunities at the junior high school, high school, and vocational high school and university levels. Future strategies should focus on providing the largest proportion of the budget to increase access to higher education, targeting provinces included in the low Human Capital Index category. Accelerating the convergence process of human capital requires both budget quantity and accuracy of budget targeting. Government spending on education must be able to provide tangible results on the quality of education by allocating a budget accessible for each level of education.

Conclusion

Provinces in Indonesia experience absolute convergence of human capital, where the inequality of human capital between provinces tends to decrease over time and leads to equity. Provinces in Indonesia also experience conditional convergence of human capital, where government spending on education can accelerate the convergence process, but not significantly. Increasing the quality of human capital and maintaining its equal distribution is determined by many factors, given the heterogeneous condition of Indonesian society. However, one of the most critical factors that can be measured and be intervened is the education budget. Increasing the quality of budget use must also be accompanied by an increase in the quantity of the budget, which has increased from year to year.

References

Acemoglu, D., & Autor, D. (2005). Lectures in Labor Economics, Chapter 1. *Lectures Notes Manuscript. MIT*.

Altiner, Ali., & Toktas, Y. (2017). Relationship Between Human Capital and Economic Growth : An Application to Developing Countries. *Eurasian Journal of Economics and Finance*, *5*(3), 87–98.

Azzizah, Y. (2015). Socio-Economic Factors on Indonesia Education Disparity. *International Education Studies*, *8*(12), 218–229.

Bappenas. (2019). Anggaran Belanja Pendidikan 20% APBN Belum Berkualitas. *Retrieved from Https://Nasional.Kontan.Co.Id/News/Bappenas-Anggaran-Belanja-Pendidikan-20-Apbn-Belum-Berkualitas on May 7, 2020*.

Barro, Robert J., & Sala-i-Martin, X. (1991). Convergence Across States and Regions. *Brookings Papers on Economic Growth*, *1*(1), 107–158.

Barro, R. J. (2001). Human Capital and Growth. *The American Economic Review*, *91*(2), 12–17.

Becker, G. . a. (2002). Human capital. *Paper given at the University of Montevideo Retreieved from Www.Um.Edu.Uy/Docs/Revistafcee/2002/Humancapital Becker.Pdf*, *July 10*, *2*.

Becker, G. . b. (2002). The Age of Human Capital. *Palo Alto: Hoover Institution Press. 3-8*.

Benhabib, J., & Spiegel, M. . (1994). The Role Of Human Capital In Economic Development Evidence From Aggregate Cross-Country Data. *Journal of Monetary Economics*, *34*(2), 143–173.

Bloom, D. E., Canning, D., & Jamison, D. T. (2004). Health, Wealth and Welfare. *Finance and Development*, *41*(1), 10–15.

BPS a. (2019). Produk Domestik Regional Bruto Provinsi-Provinsi Di Indonesia Menurut Pengeluaran 2015-2019. *Jakarta: BPS*.

BPS b. (2019). Potret Pendidikan Indonesia Statistik Pendidikan 2019. *Jakarta: BPS*.

BPS. (2020). Indeks Pembangunan Manusia (IPM) Tahun 2019. *Berita Resmi Statistik No. 21/02/Th. XXIII, 17 Februari 2020*.

Busemeyer, M. . (2008). The Impact Of Fiscal Decentralisation on Education and Other Types of Spending. *Swiss Political Science Review*, *14*(3), 451–481.

Channa, A., & Faguet, J. . (2016). Decentralization of health and education in developing countries: a quality-adjusted review of the empirical literature. *The World Bank Research Observer*, *31*(2), 199–241.

Colantonio, E., Marianacci, R., & Mattoscio, N. (2010). On human capital and economic development: some results for Africa. *Procedia-Social and Behavioral Sciences*, *9*(1), 266–272.

de la Fuente, A. (2011). Human Capital and Productivity: Barcelona Graduate School of Economics. *Retrieved from Http://Ideas.Repec.Org/ p/Bge/Wpaper/530.Html on July 10, 2020*.

Esteller, Alejandro., & Solé, A. (2005). Does Decentralization Improve the Efficiency in the Allocation of Public Investment? Evidence from Spain. *Institut d'Economia de Barcelona (IEB) Working Papers 2005/5*.

Finance, M. of. (2018). Pentingnya Pendidikan Tinggi Bagi Indonesia. *Retrieved from Https://Www.Kemenkeu.Go.Id/Publikasi/Berita/Pentingnya-Pendidikan-Tinggi-Bagi-Indonesia/ on July 7, 2020*.

Gennaioli Nicola, La Porta, Rafael, Lopez-de-Silanes, Florencio, & S. A. (2013). Human Capital and Regional Development. *Quarterly Journal of Economics*, *128*(1), 105–164.

Gillies, D. (2017). Human Capital Theory in Education. *Encyclopedia of Educational Philosophy and Theory*, 1–5.

Gujarati, Damodar N., & Porter, D. C. (2015). *Dasar-Dasar Ekonometrika Edisi ke-5*. Salemba Empat.

Hanushek, E. . (2013). Economic growth in developing countries: The role of human capital. *Economics of Education Review*, *37*(1), 204–212.

Islam, R., Ghani, A.B.A., Kusuma, B., & Theseira, B. . (2016). Education and Human Capital Effect on Malaysian Economic. *International Journal of Economics and Financial Issues*, *6*(4).

Jalil, A. (1999). Pendidikan Setelah Era Orde Baru, Cakrawala Pendidikan. *Jakarta: Universitas Terbuka*.

Lucas, E., & Shobayo, P. (2017). Effect of Expenditures on Education, Human Capital Development and Economic Growth in Nigeria. *Nile Journal of Business and Economics*, *3*(5), 40–50.

Mankiw, Nicholas G., David Romer., & D. N. W. (1992). A Contribution to the Empirics of Economic Growth. *Quarterly Journal of Economics*, *108*(10), 407–437.

Mincer, J. (1995). Economic Development, Growth of Human Capital, and the Dynamics of the Wage Structure. *Journal of Economic Growth*, *48*(744), 29–48.

Ministry of Education. (2019). Pentingnya Pendidikan Tinggi Bagi Indonesia. *Retrieved from Http://Publikasi.Data.Kemdikbud.Go.Id/UploadDir/Isi_27CAE5B1-72E1-4854-A682-36031334DA82_.Pdf on July 6, 2020*.

Murthy, N.R Vasudeva, & I. . C. (1997). The Empirics of Economic Growth for OECD Countries: Some New Findings. *Economic Letters*, *55*, 425–429.

Musanna, A. & Bahri, S. (2011). Quo Vadis Desentralisasi Pendidikan Di Indonesia Tinjauan Historis, Orientasi dan Reformulasi Desentralisasi Pendidikan. *Jurnal Ilmiah Islam Futura*, *10*(2), 101–116.

Nurarifin, Ridena, S. (2020). The Role of ICT and Human Capital Development in Pursuing a Demographic Dividend and Improving Economic Welfare in Indonesia. *The Journal of Indonesia Sustainable Development Planning, 1(2), 1*(2), 113–124.

Oates, W. E. (1993). Fiscal Decentralization and Economic Development. *National Tax Journal*, *46*(2), 237–243.

Oates, W. E. (2005). Toward A Second-Generation Theory of Fiscal Federalism. *International Tax and Public Finance*, *12*, 349–373.

Ocheni, S.I. & Agba, M. . (2018). Fiscal Decentralisation, Public Expenditure Management and Human Capital Development in Nigeria. *Academic Journal of Interdisciplinary Studies*, *7*(1), 153–165.

Purnastuti, L. & Suprayitno, B. (2016). Does Human Capital Investment Matter For Growth? Evidence From Indonesia During The Fiscal Decentralization Era. *Regional Science Inquiry*, *8*(1), 39–49.

Purwanto, E.A. & Pramusinto, A. (2018). Decentralization and Functional Assignment in Indonesia: The Case of Health and Education Services. *Policy Studies*, *39*(6), 589–606.

Sala-i-Martin, X. (1996). The Classical Approach to Convergence Analysis. *The Economic Journal*, 1019–1036.

Saraswati, E. (2012). Public Spending Education and Inequality: A case study in Indonesia. *International Journal of Social Science and Humanity*, *2*(5), 427.

Satria, D. (2018). Analisis Regresi: Model Data Panel. *Retrieved from Http://Www.Diassatria.Com/Wp-Content/Uploads/2018/05/Modul-PanelData-Eviews.Pdf on July 22, 2020*.

Subijanto, S. (2010). Prinsip-Prinsip dan Efektivitas Desentralisasi Pendidikan Dalam Rangka Meningkatkan Mutu dan Relevansi Pendidikan. *Jurnal Pendidikan Dan Kebudayaan*, *16*(5), 532–549.

Todaro, M.P., & Smith, S. . (2011). Pembangunan Ekonomi Edisi ke-11. *Jakarta: Erlangga*.

UNDP. (2016). Human Development Report. *Retrieved from Http://Hdr.Undp.Org/En/Content/Human-Development-Index-Hdi on July 10, 2020*.

Wahyudin, Dinn. & Caturwati, E. (2019). Memaknai Angka Partisipasi Kasar Pendidikan Tinggi. *Retrieved from Https://Komunita.Widyatama.Ac.Id/Memaknai-Angka-Partisipasi-Kasar-Pendidikan-Tinggi/ on July 10, 2020*.

Work, R. (2002). Overview of Decentralization Worldwide: A Stepping Stone to Improved Governance and Human Development. *Presented in International Conference on Decentralization with the Theme Federalism: The Future of Decentralising States 25-27 July, 2002, Manila, Philippines, UNDP (Pp. 1-20)*.

World Economic Forum. (2017). The Global Human Capital Report 2017 World Economic Forum. *Retrieved from Https://Www.Weforum.Org/Reports/the-Global-Human-Capital-Report-2017 on July 12, 2020*.

Zhang, X., Li, H., Wang, X. & Fleisher, B. . (2019). Human Capital and the Economic Convergence Mechanism: Evidence from China. *Retrieved from Https://Www.Iza.Org/Publications/Dp/12224/Human-Capital-and-the-Economic-Convergence-Mechanism-Evidence-from-China on July 12, 2020*.

Vol. 2 No. 1- April 2021

E-ISSN: 2722-0842 | P-ISSN: 2721-8309

Available online at
http://journal.pusbindiklatren.bappenas.go.id/

Research Paper

The Impact of Tariff Reduction on Poverty in Indonesia: Regional Level Analysis

Rizka Aulia[1*], Kangkook Lee[2]

Statistics of Sumatera Barat Province, Padang, Indonesia[1]
Graduate School of Economics, Ritsumeikan University, Shiga, Japan [2]
Email: [1]rizka@bps.go.id, [2]kangkooklee@gmail.com.

) Corresponding author

ABSTRACT

The study examines the effect of trade liberalization on poverty reduction across districts in Indonesia during the period from 2000 to 2016 using the fixed effect approach. Tariff exposure is used to measure trade liberalization, which is computed at the district level by combining information on sector composition of the economy in each district and tariff lines by sectors. This study also distinguishes between tariff exposure for output products and intermediate inputs. This produces a measure indicating how changes in exposure to tariff reductions in outputs and inputs vary by region over the period. Due to the available multi-district and 17-year dataset, the study includes a set of fixed effects: the district-fixed effects and the time-fixed effects, which controls for aggregate time trend. The results indicate that the impact of output and input tariff on regional poverty headcount index (P0) is different. Output tariff has a negative correlation with poverty, while input tariff has a positive correlation with poverty. This suggests that trade liberalization in input sectors could reduce poverty in Indonesia. It is also found that GRDP per capita, literacy rates, and road length are negatively associated with poverty. Also, the effect of reducing input tariffs on poverty reduction will be larger if the districts have higher GRDP per capita and higher literacy rates.

Keywords: poverty, tariff reduction, regional tariff exposure, output tariff, input tariff.

ARTICLE INFO

Received: March 02, 2021
Received in revised form: April 16, 2021
Accepted: April 25, 2021

doi: 10.46456/jisdep.v2i1.111

JISDeP - The Journal of Indonesia Sustainable Development Planning
Published by Centre for Planners' Development, Education, and Training (Pusbindiklatren),
Ministry of National Development Planning/ National Development Planning Agency (Bappenas), Republic of Indonesia

Address: Jalan Proklamasi 70, Central Jakarta, Indonesia 10320
Phone: +62 21 31928280/31928285
Fax: +62 21 31928281
E-mail: journal.pusbindiklatren@bappenas.go.id

Supported by Indonesian Development Planners Association (PPPI)

1. Introduction

Trade liberalization and its effects are a major and debatable issue in many countries, including Indonesia. It is like a double-edged sword. Besides creating opportunities to promote economic growth, trade liberalization can also pose severe challenges for industries in the domestic market. According to previous literature, there are two core outlooks on this issue. The first view is that trade openness contributes to poverty alleviation in developing countries. This is because increasing demand for unskilled labor leads to higher workers' real wages; therefore, it is beneficial for poor workers. On the other hand, critics argue that the advantages of trade liberalization are not enjoyed equally within the countries.

Since 1980, Indonesia has experienced massive trade liberalization involving the first decline in the average line of tariffs and a slow tariffication of non-tariff barriers at the same time. The fiscal and financial policy reform accompanied this change, such as the improvement of tax efficiency and financial deregulation. Afterward, Indonesia passed through the next phase of trade reform that began in the early 1990s, which was marked by two momentous occasions. At the end of the Uruguay Round Agreement Acts, Indonesia committed to lowering its tariffs on all of its tradable products within the next ten years. Due to the East Asian economic crisis in 1997, Indonesia was recommended by the WTO to reduce its tariffs as a recovery process. The Indonesian economy began to stabilize after the crisis in 2000. However, import tariffs continued to decline even though the reduction was not as substantial as before (Amiti & Konings, 2007).

Poverty is a major problem in Indonesia; thus, the government has put a great deal of effort into reducing the poverty rate. According to Statistics Indonesia (BPS) figures, the poverty rates have had a downward trend in recent years, which has decreased gradually. The proportion of the population in Indonesia that live under the poverty line in 2018 was 9.74%, which was a slight decrease compared to the previous year, which was 10.38%. It is found that the main source of reduction in poverty in most countries is economic growth. Most economists believe that economic growth benefits nearly all citizens of a country, if not equally, at least in reducing poverty. In Indonesia, it is presumed that there was an increase in employment opportunities during periods of high and sustained economic growth.

Several researchers have presented various studies about trade liberalization and poverty in Indonesia over the last decade. Some of them use Trade Openness Ratio as a measurement approach for free trade (Adha, Nahar, & Azizurrohman, 2018) and Tambunan (Tambunan, 2008). Besides, some studies use tariff exposure to measure trade liberalization. This is because tariffs or non-tariff barriers are more relevant to trade liberalization policy. Recently, researchers are not only looking at changes in the simple average tariff within the period of analysis. Those studies also aim to investigate the differences in tariffs, combined with information on production structure between tradable sectors in each region. This is exemplified in the study undertaken by Kis-Katos & Sparrow (2015), which investigates the effect of trade openness measured by tariffs across industries on Indonesia's poverty.

Like Topalova (2010), Kis-Katos & Sparrow (2015) distinguish tariffs on output products and intermediate inputs by creating an alternative measurement that reflects the structures of regional sectoral input based on national input-output. They report that poverty and tariff exposure in output products have a negative correlation. Conversely, poverty and tariffs of intermediate products are positively correlated.

However, there is a possibility that the measurement of regional exposure for input tariffs is biased. Kis-Katos & Sparrow (2015) use a national input-output table to compute regional exposure to input tariffs. Nonetheless, the economic structure of the region in Indonesia is contradictory. Therefore, to eliminate the possibility of biased results, this study uses regional (provincial) input-output tables to compute regional tariff exposure. The measurements of regional tariff exposure are used to explore how international trade affects regional poverty levels in Indonesia during the period from 2000 to 2016 at the regional level.

2. Methodology

2.1 Theoretical Framework

Existing literature has revealed the main transmission channels that explain the linkages between trade liberalization and poverty, economic growth, government, markets, and employment (Winters & Martuscelli, 2014). Firstly, trade liberalization could affect the incomes of the poor through an increase in economic growth. Notably, technology transfers due to imports and foreign investment are expected to generate aggregate income.

Secondly, the trade liberalization and poverty nexus involve government income and expenditure. Trade liberalization leads to a decline in government revenue, which in turn affects the direct transfers to the poor. Moreover, the government can use trade taxes as a source available for poverty reduction programs (Naranpanawa, Bandara, & Selvanathan, 2011).

Thirdly, the effects of trade liberalization on poverty are linked through the substitution and income effects. Changes in prices generated by trade liberalization affect both nominal and real household incomes. Based on the Stolper-Samuelson theory, the imposition of tariffs increases the price of an item (Goldberg & Pavcnik, 2005) and vice versa. Tariff reduction can cause the price of imported goods and goods that compete with imported goods to become relatively low. Consequently, goods that compete with imported goods go unsold in the market. Furthermore, industries that produce goods that compete with imported goods must reduce the price of their goods to compete and survive in the market. Then this item price factor will further influence decisions in households. If the price of goods decreases, the household will increase the consumption of the goods (demand for goods increases). It also has an impact on increasing labor demand so that wages will increase.

The relationship of trade liberalization to income distribution, in the long run, is well also explained in the Stolper-Samuelson model, based on the Hecksher-Ohlin neoclassical trade model. This theory can be intuitively explained as follows. Trade liberalization increases the income of relatively abundant production factors. Conversely, it decreases the income of relatively scarce production factors. That is, the owners of abundant factors of production will benefit from trade liberalization, while the owners of rare factors of production will suffer losses (Appleyard, Field, & Cobb, 2006). In developing countries, the abundant resource factor is unskilled labor. Under these conditions, falling prices on imported intermediate goods in developing countries will cause an increase in industrial output that intensively uses unskilled labor (an abundant factor), thereby increasing demand and wages of unskilled labor (Goldberg & Pavcnik, 2005; McCulloch, Winters, & Cirera, 2002). Therefore, the relationship between prices and wages will be negative according to the Stolper-Samuelson argument. In short, in relatively unskilled labor-abundant countries, trade liberalization will reduce poverty; not all developing nations fall into this class.

Kis-Katos & Sparrow (2015) explain the impact of trade liberalization on poverty through employment channels. It can be inferred that competition in the domestic market will increase when the government reduces import tariffs in a sector, which means the prices of imported products in that sector become cheaper. Local firms that experience increased competition will respond to falling prices for imported products by lowering their product prices. They, thus, will be able to compete with cheaper imported products in the domestic market. This price reduction leads firms to reduce their demand for labor because the value of extra output produced by hiring one more unit of labor will decrease. The number of vacancies posted by the firms will decline, which means market tightness in the sector will also decrease. The decrease in market tightness causes a higher possibility of someone being unemployed. Thus, the unemployment rate in the sector is increasing (Hasan, Mitra, Ranjan, & Ahsan, 2012). Nuryitmawan (2020) states that unemployment is a key determinant of poverty. Being unemployed leads to the reduction of the standard of living due to reduced income. With a multisector model, it can be concluded that the reduction in import tariffs has an impact on increasing unemployment in sectors where firms experience competition with imported products on the domestic market (competing sectors of imports). In other words, a reduction in tariffs will have an impact on increasing poverty. Tariffs, in this case, are output tariffs.

Nevertheless, import tariffs cannot only have an impact on firms experiencing competition with imported products in the domestic market. Import tariffs can also affect firms using imported products as input in their production. These local firms experience cost advantages because of lower input costs, in this case, input tariffs. A decrease in input tariffs can increase profits for local firms that use imported products as production inputs. The increased profits can encourage firms to expand their

businesses. The business expansion enables the firms to increase their demand for labor, which means employment is increasing. Under the assumption of free entry conditions, increased profits can also attract new firms to enter the domestic market, so that job creation occurs. The demand for labor increases so that employment ultimately increases. Increased profits due to lower input costs can also encourage firms to increase wages paid to their workers. In this case, the firms have increased productivity, so they are willing to pay higher wages for their workers. Thus, the impact of input tariff liberalization is negatively correlated to wages. This means that trade liberalization measured by tariff reduction has a positive relationship with poverty rates. Any empirical analysis of the trade liberalization-poverty link depends on input and output tariffs related to domestic firms' competitiveness and employment.

One method to measure tariff exposure from the national level to the measurement of tariff exposure at the regional level is proposed by Topalova (2007). Topalova uses a method of regional tariff exposure in the form of a weighted sum of tariffs of each tradable sector product in an area, namely agriculture, mining, and manufacturing. This measurement utilizes the share of labor from each tradable sector to the total workforce in the initial period of each research observation. The calculation method is as follows:

$$Tariff_{k,t} = \frac{\Sigma_s Worker_{s,k,t_0} * \ tariff_{s,t}}{TotalWorker_{k,t_0}} \quad (1)$$

Where *s* is the tradable sector, *k* is the district, t_0 is the initial year of research observation, $Tariff_{k,t}$ is the import tariff of the product in sector *k* in year *t*, $Worker_{s,k,t_0}$ is the number of labor in the sector *s* district *k* in the year t_0, and the $TotalWorker_{k,t_0}$ is the total workforce in district *k* in the year t_0.

The measurement of regional tariff exposure in equation (1) uses the weight of labor share in each workforce's tradable sector. However, the use of these weights is assumed to cause high sensitivity to the allocation of workers who work in non-tradable sectors, which can cause the estimation results to be spurious. Therefore, Topalova (Topalova, 2007) provides an instrument for this measure, which is $TrTariffk$, defined as:

$$TrTariff_{k,t} = \frac{\Sigma_s Worker_{k,s,t_0} * \ tariff_{s,t}}{\Sigma_s Worker_{k,s,t_0}} \quad (2)$$

This measure is a non-scaled tariff that ignores labor in the non-tradable sector while $Tariff_{k,t}$ is a scaled tariff. The measurement of regional tariff exposure proposed by Topalova (Topalova, 2007) is followed by many other studies that also examine the impact of trade liberalization at the regional level. An example of this is the study by Hasan, which investigates the impact of trade liberalization in India on unemployment at the state level. Another example is research conducted by Edmonds, Pavcnik, & Topalova (2010), which shows the impact of trade liberalization on children's decisions going to school and working in India.

While Topalova (2007) uses labor share as the weights, Krisztina Kis-Katos & Sparrow (2011) introduce different weights to measure regional tariff exposure in their research, examining the relationship between trade liberalization and child labor in Indonesia at the district level. Krisztina Kis-Katos & Sparrow (2011) use the share of sectoral GRDP as a weighting in measuring regional tariff exposure, arguing that differences in economic structure between regions differ not only in terms of the composition of the workforce but also from the total output. This measurement method also ignores non-tradable sectors. The alternative calculation method for regional tariff exposure is as follows:

$$TrTariff_{k,t} = \sum_s \left(\frac{GRDP_{s,k,t_0}}{GRDP_{k,t_0}} * Tariff_{s,t} \right) \quad (3)$$

Where *s* is the sector, *k* is the district, t_0 is the initial year, $GRDP_{s,k,t_0}$ is the GRDP of the sector *s* in the district *k* in the initial year of observation, $GRDP_{k,t_0}$ is GRDP of district *k* in the initial year of observation, and $TrTariff_{k,t}$ is the tariff in district *k* in year *t*.

In a subsequent study of the effect of trade liberalization on poverty and the labor market in Indonesia, Kis-Katos & Sparrow (2015) use the information on regional employment share to measure regional tariff exposure at the district level. Afterward, the calculation distinctions between tariffs on output products and the tariff on intermediate inputs, following the ideas of Amiti & Konings (2007). Information on the output structure is obtained from the Large and Medium Manufacturing Survey,

whereas the input structure is obtained from the Input-Output (I-O) table. The methods for calculating regional tariff exposure for output products and intermediate inputs are as follows:

$$OutputTariff_{k,t} = \sum_s \left(\frac{Q_{s,k,t_0}}{Q_{k,t_0}} * Tariff_{s,t} \right) \quad (4)$$

$$InputTariff_{k,t} = \sum_s \left(\frac{Q_{s,k,t_0}}{Q_{k,t_0}} * \sum_j \left(\frac{M_{j,s,t_0}}{M_{s,t_0}} * Tariff_{j,t} \right) \right) \quad (5)$$

where s is the output sector, j is the input sector, k is the district, t_0 is the initial year, Q_{s,k,t_0} is the sector output s in the district k in the initial year, M_{j,s,t_0} is the input j of the output s in the initial year, Q_{k,t_0} is the total output in the district k in the initial year t_0, M_{s,t_0} is the total input of output s in the initial year, $Tariff_{s,t}$ is the product tariff in the s sector in t, and $Tariff_{j,t}$ is the tariff of input j in year t. In this study, they also do not include the non-tradable sector in calculating regional tariff exposure.

2.2. Data and Methodology

Following Topalova (2007) and Kis-Katos & Sparrow (2015), the size of regional tariff exposures is a weighted sum of the tradable sector tariffs in an area. Weight is calculated based on employment share in a tradable sector from the total workforce in a region. This method captures differences in the level of exposure through differences in the structure of production in an area based on labor allocation. The weight of a tradable sector's tariffs will be higher if the sector has a relatively more labor allocation. The following calculation obtains the value of the tariff exposure of a district:

$$OutputTariff_{kt} = \sum_{s=1}^{s=30} \left(\frac{L_{sk,t=0}}{L_{k,t=0}} x\ Tariff_{st} \right) \quad (6)$$

Where *s* is output sector, *k* is a district, t=0 is initial period, $L_{sk,t=0}$ is the employment of the output sector *s* of district *k* in the initial period, $L_{k,t=0}$ is the total labor force of district *k* in the initial period, $Tariff_{st}$ is product tariff in the sector in year *t*.

The value of the regional tariff exposure at the district level is expected to illustrate the level of sensitivity to trade liberalization at the district level. The higher the value of regional exposure of a district, the more sensitive it is to reduce import tariffs due to trade liberalization. In other words, these districts experience greater trade reforms.

There are two steps of preparation before calculating regional tariff exposure at the district level. The first step is grouping the tradable sectors. In this study, products are classified into 30 tradable sector groups (including agriculture, mining, and manufacturing) based on International Standard Industrial Classification (ISIC) Rev. 3 at the 2-digit level. This aims to match with labor affiliation sectors that are available in *Sakernas*. Therefore, it requires a concordance from Harmonized System at the 6-digit of WITS tariff data to the ISIC rev 3 classification at 2-digit level. Details of the 30 sectors used in this study are as follows:

Table 1. Tradable Sector Groups Based on ISIC Rev. 3 at 2-Digit level

ISIC Code	Description
01	Agriculture, Plantation, and Hunting
02	Forestry and Logging
05	Fishery
10	Coal and Lignite Mining
11	Crude Petroleum, Natural Gas, and Geothermal
12	Uranium and Thorium Ore Mining

13	Iron Ore Mining
14	Other Mining and Quarrying
15	Manufacture of Food Products and Beverages
16	Manufacture of Tobacco Products
17	Manufacture of Textiles
18	Manufacture of Wearing Apparel
19	Manufacture of Leather and Related Products and Footwear
20	Manufacture of Wood and of Products of Wood
21	Manufacture of Paper and Paper Products
22	Printing and Reproduction of Recorded Media
23	Manufacture of Coal and Refined Petroleum Products
24	Manufacture of Chemicals and Pharmaceuticals and Botanical Products
25	Manufacture of Rubber, Rubber Products, and Plastics Products
26	Manufacture of Other Non-Metallic Mineral Products
27	Manufacture of Basic Metals
28	Manufacture of Fabricated Metal Products, Except Machinery and Equipment
29	Manufacture of Machinery and Equipment
30	Manufacture of Office, Accounting, and Computing Machinery
31	Manufacture of Electric Machinery and Apparatus
32	Manufacture of Radio, Television, and Communication Equipment and Apparatus
33	Manufacture of Medical, Precision, and Optical Instruments, Watches, and Clocks
34	Manufacture of Motor Vehicles, Trailers and Semi-Trailers
35	Manufacture of Other Transport Equipment
36	Furniture and Other Manufacturing

Note. Adapted from Statistics Indonesia (*BPS*)

The calculation of regional tariff exposure at the district level in this study does not include non-tradable sectors. Kovak (2013) shows in his study that prices of non-tradable goods moved simultaneously with prices of tradable goods during liberalization. Hence, the non-tradable sector could be ignored in calculating regional tariff exposure at the regional level. The result of the calculation of import tariffs is called output tariffs.

Subsequently, the information on output tariffs is used to calculate the intermediate input tariffs with the average method. Information about the weighted average input of a product is obtained from the 2000 use table, which is controlled with a more aggregate level using the 2000 Input-Output Table for each province.

For computing input tariff, the calculation is given as follows:

$$InputTariff_{kt} = \sum_{s=1}^{s=30} \left(\frac{L_{sk,t=0}}{L_{k,t=0}} x \sum_{j=1}^{J} \left(\frac{M_{js,t=0}}{M_{s,t=0}} x Tariff_{jt} \right) \right) \quad (7)$$

Where *s* is output sector, *j* is input sector, *k* is district, t=0 is initial period, $L_{sk,t=0}$ is the employment of the output sector *s* of district *k* in the initial period, $L_{k,t=0}$ is the total labor force of district *k* in the initial period, $M_{js,t=0}$ is input *j* from output *s* in the initial period at the province level, $M_{s,t=0}$ is input total from output *s* in the initial period at the province level, $Tariff_{jt}$ is the tariff of input product *j* in year *t.*

This study employs the fixed effect estimation method to reach its purpose, and the model is as follows:

$$y_{k,t} = \beta_0 + \beta_1 OutputTarif_{k,t-1} + \beta_2 InputTariff_{k,t-1} + \sum_{t=1}^{3} \delta_i X_{i,k,t} + \alpha_k \varepsilon_{k,t} \quad (8)$$

Where $y_{k,t}$ is poverty headcount index (P0) varied by *k* districts and *t* time, $OutputTarif_{k,t-1}$ is regional exposure for output products varied by *k* districts and *t-1* time. $InputTariff_{k,t-1}$ is regional exposure for intermediate inputs by *k* districts and *t-1* time. β_0, β_1, and β_2 are parameters of the fixed-effect model. $X_{i,k,t}$ is a vector of other control variables (log of GRDP per capita, literacy rate, and road length) varied by *k* districts and *t* time, $\varepsilon_{k,t}$ is error term of district *k* at year *t*.

To test the hypotheses, this study uses panel data with districts in Indonesia as cross-section units analyzed during the period from 2000 to 2016. Panel data helps to identify the differences in the impact of trade liberalization on poverty between districts. Districts (regencies or municipalities) used as the unit of analysis in this study are based on the administrative condition of the regions in the year 2000, which amounted to 303 districts. New districts which emerged after the year 2000 due to the proliferation of administrative regions will be returned to their parent or initial districts. The issue of regional proliferation is an important concern in regional analysis in Indonesia because most districts in Indonesia experience proliferation and generate new districts.

To calculate the poverty headcount index (P0) for initial districts, this study requires information about the number of poor people and the population of each new district that emerged. By dividing the total population of the poor with the total population into the initial districts, the poverty headcount index (P0) for each original district can be obtained. Furthermore, the poverty gap index (P1) and poverty severity index (P2) measurements for original districts require poverty line and household expenditure information. Due to the lack of this information, this study cannot involve the poverty headcount index (P1) and poverty severity index (P2).

The data on employment in 2000 are required for the calculation of regional tariff exposure. However, there are missing data on employment in several districts in 2000. Therefore, the districts experiencing missing data are not involved in the analysis, including Aceh Selatan, Maluku Tenggara, Maluku Tengah, Maluku Utara, Halmahera Tengah, and the City of Ambon. The total remaining districts that become the unit of analysis in this study are 297 districts.

In terms of variables, this research requires several data. First, information regarding tariffs comes from the UNCTAD-TRAINS database, which is retrieved from the WITS website. The sectors involved in the analysis of this study are 30 tradable sectors covering agriculture, mining, and manufacturing. Second, data of poverty measurements are obtained from Statistics Indonesia, which annually publishes the data of the poverty headcount index (P0). Third, data regarding regional employment share, which are involved in computing regional tariff exposure, are sourced from *Sakernas* (the annual labor force survey). Information on the allocation of labor in a certain tradable industry in each district or city is obtained by calculating the ratio. Information on the number of workers in each district is obtained from the *Sakernas* data of 2000. These data of *Sakernas* are not representative for estimates at the district level. Hence, the calculation of the aggregate data uses the inflation factor, which is available in the data. Fourth, information about the weighted average input of a product is obtained from the Input-Output Table 2000 for each province. The measurement of input tariffs in this study is carried out by calculating the weighted average of the output tariffs. In line with Kis-Katos & Sparrow (2015), this study uses weight based on the input structure in the Input-Output Table 2000. The use of the 2000 input structure is deemed appropriate because the year 2000 is the initial year of this research

period. According to the measurement proposed by Amiti and Konings (Amiti & Konings, 2007), regional input tariffs calculation uses the input structure of the initial period. Also, the intermediate input structure used in a region is assumed not to change in the short term. Also, the updated IO table after 2000 is not yet available in all provinces.

Moreover, Gross Regional Domestic Product (GRDP) per capita, literacy rate, road length are used as control variables in this study. Data for these variables have been taken from Statistic Information Books published by Statistics Indonesia.

3. Results and Discussion

This study uses data from Statistics Indonesia (BPS) in 2000-2017 to conduct a descriptive analysis of poverty rates in Indonesia. As a basis for measuring poverty, BPS uses the concept of a person's ability to meet basic needs. With this approach, poverty is seen as an inability from the economic side to meet basic food and non-food needs measured from the poverty line. Thus, the poverty headcount index (P0), the percentage of the population under the poverty line, can be calculated. As previously explained in Research Methodology Chapter, the poverty line method consists of two components: the food poverty line and the non-food poverty line. Hence, the poor are residents who have an average monthly expenditure per capita below the poverty line. Indonesia's national poverty line was set at consumption outlays of Rp. 374,477- per month per person, while the latest Indonesia's national poverty line was recorded at Rp. 425,250,- in 2019.

The advantage of the poverty headcount index is that it is easy to calculate and easy to understand. However, this indicator has several weaknesses: the headcount index does not consider the intensity of poverty, does not indicate how poor the poor are, and does not change if people below the poverty line become poorer. Despite the percentage of poor households, the poverty headcount index measures the percentage of poor individuals. For the percentage of households to apply, an assumption is made that all household members enjoy the same welfare level. However, in reality, not all consumption is shared equally among all household members.

The development of poverty levels in Indonesia in the period 2000-2017 is shown in Figure 1. In the period 2000-2005, there was a declining trend, although the number of poor people in 2002 experienced a slight increase compared to 2001. The reduction in poverty levels occurred again during the 2006-2013 periods. During this period, the number of poor people decreased by 6.38 million people, from 39.30 million people in 2006 to 28.07 million people in 2013. In absolute terms, the percentage of the poor population decreased from 17.75% in 2006 to 11.37% in 2013. Furthermore, in 2014 the number of poor people increased and reached 28.59 million people in 2015. Afterward, it dropped to 27.7 million people in 2017. However, in relative terms, the percentage of poverty fell steadily in the final years to 10.64% in 2017.

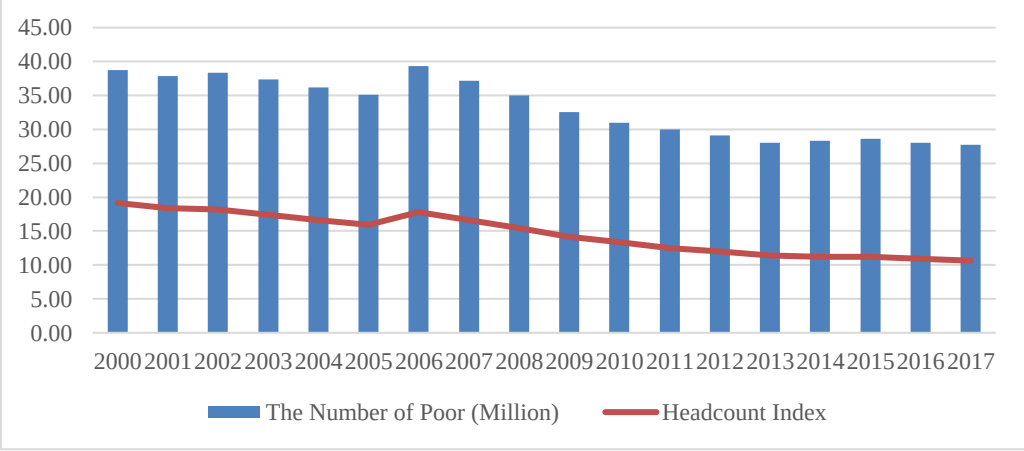


Figure 1. The Number and Percentage of People Living in Poverty Indonesia, 2000-2017
Source: Statistics Indonesia (BPS)

There were three factors driving poverty reduction at the end of the period of analysis. First, inflation was maintained within the stable target range of 4% plus 1%. The government was considered

to be successful in maintaining price stability, especially in the food component. The second was the increase in real agricultural wage rates in rural areas, and third, the integration of poverty alleviation programs (Zuhdiyaty & Kaluge, 2018).

Table 2 shows the variation in regional tariff exposure by island. Generally, the average regional tariff exposure in all regions in the 2000-2008 period tends to increase. To overcome the surge in import flows into the domestic market in the period 2004-2008, the government felt the need to implement a trade security policy through AntiDumping Duty. Therefore, it is seen that the government is more inclined to make Indonesia's foreign trade policy move towards a protective direction by increasing import tariffs. Several industries experienced tariff increases during the period 2000-2008, for example, food and beverages (from 6.76% to 14.23%), textiles (from 7.51% to 9.67%), wearing apparels (from 10.05% to 14.09%), chemicals, and pharmaceuticals, and botanical products (from 8.84% to 4.80%), and basic metal (from 5.45% to 6.57%).

Table 2. Average Regional Tariff Exposure in Indonesia, 2000-2016

Island	2000	2004	2008	2012	2016
Sumatera	4.120	4.666	5.930	2.629	1.843
Java	4.815	5.172	6.967	3.187	2.309
Bali and Nusa Tenggara	4.275	4.729	6.136	2.640	1.964
Kalimantan	3.855	4.247	5.308	2.063	1.726
Sulawesi	4.175	4.864	6.129	3.083	1.816
Papua	3.547	3.847	4.883	1.678	1.476

Source: WITS, data is processed

Moreover, the greatest increase in the average regional tariff exposure occurred in Java Island compared to other regions in Indonesia. This could be attributed to industries that experienced increased tariffs and absorbed much of the labor force located on Java Island, such as food products and beverages, tobacco products, textiles, wearing apparel, motor vehicles, trailers, and semi-trailers companies. Over the period of 2012-2016, the islands that had the largest decreases in regional tariff exposure to the global economy were Sulawesi and Java, followed by Sumatera, and Bali, and Nusa Tenggara.

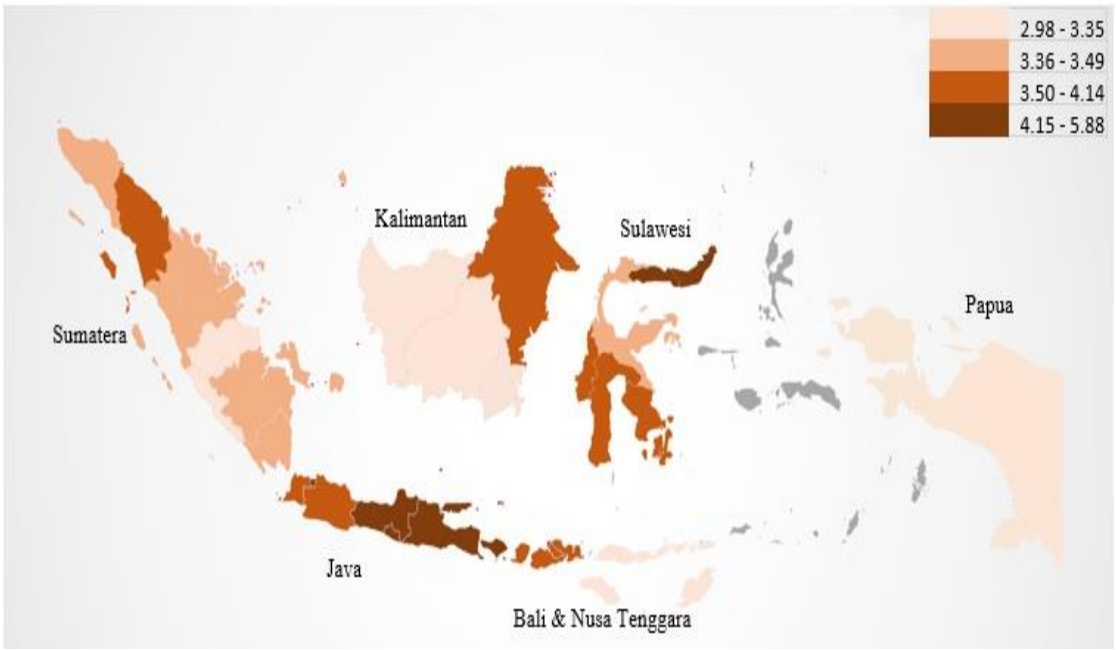


Figure 2. Regional Tariff Exposure for Output Products in Indonesia (2000-2016)
Source: Statistics Indonesia and UNCTAD-TRAINS, processed

Furthermore, the City of Kediri, Kudus Regency, and the City of Manado have the highest average regional tariff exposure than other districts during the 2000-2016 period. These regions have more tradable sector compositions than other regions. It can be inferred that these regions with high

regional tariff exposure are more sensitive to import tariffs. Conversely, the region with the lowest average regional tariff exposure is Papua. It implies that districts in the Papua region are less sensitive to changes in import tariffs. Mimika Regency and Merauke Regency have the lowest average regional tariff exposure compared to other districts during the 2000-2016 period.

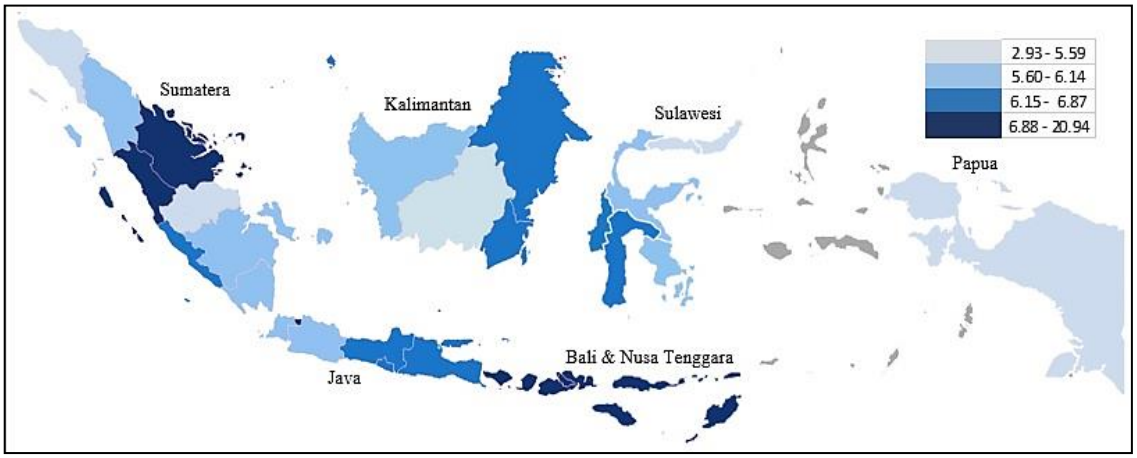


Figure 3. Regional Tariff Exposure for Intermediate Inputs in Indonesia (2000-2016)
Data Source: Statistics Indonesia and UNCTAD-TRAINS, processed

Figure 3 maps the variation of regional tariff exposure for intermediate inputs. The districts more sensitive to input tariffs are located in Jakarta, Sumatera Barat, Riau, and Bali, and Nusa Tenggara. Input tariff indicates the sensitivity of a district to tariffs on imported goods used as intermediate inputs in the local industries. High input tariffs indicate that the component of industrial products in a district are mostly products with high import tariffs and vice versa. Low input tariffs imply that industries in districts do not depend on imported intermediate inputs with high tariffs.

The regression results of the fixed effects model are reported in Table 3. Column (1) revealed that the results of basic regression specification indicate that import tariffs, both of output products and intermediate inputs, are associated with poverty rates at the district level. The coefficient estimates that output tariffs and input tariffs are both statistically significant and positive, suggesting that a reduction in tariff exposure leads to a decrease in poverty rates. The next step is to add year-fixed effects.

Table 3. Estimated Results of the Impact of Trade Liberalization on the Poverty Rates (Fixed Effects Model)

Variable	(1)	(2)
Output Tariff	0.2257***	-0.2846***
	(0.0519)	(0.6027)
Input Tariff	0.3278***	0.0501*
	(0.0231)	(0.0201)
Constant	11.4373***	20.1923***
N Observations	5,049	5,049
N districts	297	297
Time Variant Controls	No	Yes
R-Squared	0.1300	0.6011
adjusted R-squared	0.0753	0.5746

Note: Dependent variable is the poverty rate measured by the headcount index. All standard errors are robust and reported in parentheses.
* Significant at 10%
** Significant at 5%
*** Significant at 1%

As shown in column 2 of Table 3, the result for the variable of output tariff completely reverses after controlling for year fixed effects. These primary results are consistent with the findings of Kis-Katos & Sparrow (2015). Using the first difference specification, they establish that output tariffs have a strong and negative impact on poverty rates instead of input tariffs, which significantly and positively affect

poverty rates in Indonesia. They also include the time effect in their model, which allows controlling time-specific fixed effects. Compared to the base regression in model (1), model (2) is relatively better here due to its control for national anti-poverty actions by the Indonesian government (Bhattacharyya & Resosudarmo, 2015).

Column 2 of Table 3 shows that a fall in output tariffs of 10 percentage points increases poverty rates by 2.8 percentage points. This significant negative coefficient reveals that trade liberalization would increase competition in the output market in Indonesia. Attanasio, Goldberg, & Pavcnik (2004) and Schor (2004) argue that the tariff reduction on output goods can affect competition between firms that produce the same product. When there is a reduction in the final goods tariff, firms seek to increase market share through increased efficiency. This certainly hurts local firms that have limited capital. Hence, firms may have reduced costs by recruiting temporary workers. They even terminated their workers to cover losses. This will result in households receiving reduced income. Ultimately, they cannot fulfill their daily needs, and poverty alleviation cannot be implemented.

Columns 1 and 2 of Table 3 report the coefficients of input tariff in these benchmarking regressions. Based on the estimation results of these models, the coefficient of input tariff is significant and positive. The positive coefficient indicates that input tariff reduction contributes to poverty reduction, even though relatively small. These results are in line with the findings in the study of Hasan et al. (Hasan et al., 2012). Their research suggests that a reduction in input tariffs can cause a decrease in the unemployment rate at the district level. Therefore, this will be beneficial for poverty reduction. These findings provide an insight into the positive correlation between input tariffs and poverty rates. The lower tariff for intermediate inputs causes a decrease in input costs. Firms will get more profit; thereby, the firms expand their businesses so that the firms' size is getting bigger. This can create employment and reduce poverty further.

To reduce the potential for spurious findings, control variables are included in this statistical model. Table 4 presents results using GRDP, literacy rates, and road length as the control variables. Similar to the previous basic model, the regression of these specifications is conducted, either by taking into account the year dummies or overlooking them. The results in column 3 and column 4 in Table 4 indicate that the main variables, output tariffs, and input tariffs, remain significant. However, taking into account the overall effects of control variables on poverty rates, it is found that the coefficients of output tariffs and input tariffs diminish. Table 4 also displays the results obtained from the analysis of control variables accounted for in this study. It is found that, as hypothesized, all control variables are significant and are negatively associated with poverty rates in Indonesia at the district level.

Table 4. Estimated Results of the Impact of Trade Liberalization on the Poverty Rates with Control Variables (Fixed Effects Model)

Variables	(1)	(2)	(3)	(4)
Output Tariff	0.2257***	-0.2846***	0.0188**	-0.1897***
	(0.0519)	(0.6027)	(0.0369)	(0.0548)
Input Tariff	0.3278***	0.0501*	0.079***	0.0422**
	(0.0231)	(0.0201)	(0.0171)	(0.0194)
Ln GRDP			-11.6759***	-0.2119***
			(0.6290)	(0.7482)
Literacy			-3.2047***	-0.2175***
			(0.0175)	(0.0162)
Road Length			-0.0002***	-0.0001***
			(0.0000)	(0.0000143)
Constant	11.4373***	20.1923***	57.9049***	38.7645***
	(0.1408)	(0.3311)	(1.3962)	(1.5466)
N Observations	5,049	5,049	5,049	5,049
N districts	297	297	297	297
Time Variant Controls	No	Yes	No	Yes
R-Squared	0.1300	0.6011	0.5057	0.6131
adjusted R-squared	0.0753	0.5746	0.4672	0.5837

Note: Dependent variable is the poverty rate measured by the headcount index. All standard errors are robust and reported in parentheses.

* Significant at 10% ** Significant at 5%*** Significant at 1%

This study also investigates differential effects by each control variable. To see the difference in the impact of the import tariffs reduction for both final goods and intermediate inputs between districts, the variable of regional tariff exposure was lagged to interact with the control variables. Table 5

presents estimated results considering the interaction of output tariffs with further control variables: GRDP, literacy rates, road length, and the input tariffs.

Model (i) shows that the interaction term of output tariffs and GRDP per capita on poverty rates is negative and statistically significant at 5%. It indicates that the increase in output tariff results in a decline of the district level's poverty rates. Furthermore, the increase of output tariff leads to lower poverty in districts with higher GRDP per capita. The level of GRDP is a condition that high output tariff leads to lower poverty rates. This effect is transmitted through the higher price of imported goods, enabling households to increase the demand for domestic products. Firms thus promote their businesses and increase wages and, in turn, will benefit the region with higher GRDP per capita. This indicates that when there is an increase in tariffs on output products, districts with higher GRDP per capita will have lower poverty.

Model (iii) reports the estimated results of the interaction term between output tariffs and road length and are positive and statistically significant at 1%. This means that the reduction in output tariffs increases poverty rates at the district level. Moreover, the reduction of output tariff leads to higher poverty in districts with lesser road length. When there is a decrease in output products, districts with poor access to markets will have higher poverty.

Table 5. Estimated Results of Interaction Terms of Output Tariffs and Input Tariffs with Other Control Variables (Fixed Effects Model)

Variables	(1)	(2)	(3)	(4)	(5)	(6)
Output Tariff	-0.2915**	-0.9780**	-0.4667***	-0.3144***	-0.1666**	-0.2031***
	(0.1005)	(0.3101)	(0.0777)	(0.0564)	(0.0552)	(0.0549)
Input Tariff	0.0206**	0.0300*	0.0556**	0.10034**	0.4260***	0.02478
	(0.0214)	(0.0196)	(0.0195)	(0.0261)	(0.1128)	(0.0254)
Ln GRDP	-1.7589**	-0.1828	-0.2182**	-2.5174**	-0.1174***	0.4061
	(0.8422)	(0.7470)	(0.7460)	(0.8230)	(0.7477)	(0.7483)
Literacy	-0.2098***	-0.1706***	-0.2108***	-0.2056***	-0.1790***	-0.2144***
	(0.0174)	(0.0203)	(0.0162)	(0.0173)	(0.0196)	(0.0162)
Road Length	-0.0001***	-0.0001***	-0.0001***	-0.0001***	-0.0001***	-0.0001***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Output Tariff*Ln GRDP	-0.0704**					
	(0.0758)					
Output Tariff*Literacy		-0.01207				
		(0.0032)				
Output Tariff*Road Length			9.79E-06***			
			(1.9500)			
Input Tariff*Ln GRDP				0.1877***		
				(0.039)		
Input Tariff*Literacy					0.0045***	
					(0.0013)	
Input Tariff*Road						4.29E-06
						(1.0600)
Constant	37.7989***	34.2269***	39.0003***	37.2359***	35.3966***	38.6397***
	(1.6577)	(1.9471)	(1.5428)	(1.6495)	(1.8264)	(1.5440)
N Observations	5,049	5,049	5,049	5,049	5,049	5,049
N districts	297	297	297	297	297	297
Time Variant Controls	Yes	Yes	Yes	Yes	Yes	Yes
R-Squared	0.6030	0.6145	0.6155	0.6050	0.6143	0.6147
adjusted R-squared	0.5705	0.5851	0.5861	0.5729	0.5848	0.5853

Note: Dependent variable is the poverty rate measured by the headcount index. All standard errors are robust and reported in parentheses.
* Significant at 10%
** Significant at 5%
*** Significant at 1%

In model (iv), it can be seen that the interaction term between input tariffs and GRDP per capita has a positive coefficient and is significant at 1%. It can be inferred that the reduction in input tariffs decreases poverty rates at the district level. Furthermore, the reduction of input tariffs leads to lower poverty in districts of higher GRDP per capita. In districts with higher GRDP, the effects of input

tariff reduction on poverty reduction are larger. Clearly, the level of GRDP shows that low input tariffs lead to lower poverty rates.

Furthermore, model (v) reveals that the impact of interaction terms of input tariffs and literacy rate on poverty rates is positive and statistically significant at 1%. This implies that the reduction in input tariff results in a decrease in poverty rates at the district level. Furthermore, the reduction of input tariffs leads to higher poverty in districts with higher literacy rates. Clearly, the level of literacy rates shows that low input tariffs lead to lower poverty rates.

Nevertheless, when the output tariff interacts with literacy rates, it is found that the interaction variable is not significant. This insignificance also happens in the interaction of input tariffs and road length.

Robustness Check

The general effects of trade liberalization on poverty for further specifications, following the first difference estimating equation by Kis-Katos & Sparrow (2015), are shown in Table 6.

Table 6. Robustness Check Poverty Effects of Trade Liberalization
(Fixed Effects Model)

Variables	(1)	(2)	(3)
Output Tariff	0.0909	-0.3172***	-0.3996***
	(0.0795)	(0.0860)	(0.1009)
Input Tariff	0.0345*	0.0324**	0.0303**
	(0.0344)	(0.0317)	(0.0325)
Ln GRDP			
Literacy			
Road Length			
Constant	-2.7124***	-1.1636***	-0.3638***
	(0.2747)	(0.2732)	(0.4390)
N Observations	4,752	4,752	4,752
N districts	297	297	297
Year-Island dummies	Yes	Yes	Yes
Time Variant Controls	No	Yes	Yes
Initial Labor Force	No	No	Yes
R-Squared	0.024	0.3642	0.3545
adjusted R-squared	0.010	0.1473	0.1311

Note: Each block of the table reports tariff coefficients, generated by first difference estimates of the reported dependent variables on tariffs and further controls. All standard errors are robust and reported in parentheses.
* Significant at 10%
** Significant at 5%
*** Significant at 1%

The negative relationship between the poverty and output tariffs emerges after controlling the time-year-island dummies and time-variant controls, inferring that tariff reduction on output products is negatively associated with a poverty reduction. In contrast, under the initial conditions, the reduction in intermediate inputs is statistically significant and positively correlated with a poverty reduction.

These results show that the relationship between poverty and regional tariff exposure, either for output products or intermediate inputs, is robust. Therefore, these findings provide additional evidence for the linkage between trade liberalization and poverty.

Conclusion

This study examines the linkages between trade liberalization and poverty. It particularly seeks to learn the effects of tariff reduction on the incidence of poverty at the district level in Indonesia from 2000 to 2016. This study assesses reductions in tariffs on imported goods as a whole and investigates the impacts of intermediate input tariffs, which are measured as a weighted average of the output tariffs based on the input-output table. Using the fixed effects model, the estimation results show that tariff exposure for intermediate inputs and final goods has the opposite effect by the theory. A reduction in output tariffs leads to a higher poverty rate. Conversely, a decrease in input tariffs generates a poverty reduction. These primary results prove the main hypotheses of this study.

Expanding the model with further controls, it is found that GRDP per capita, literacy rates, and road length are negatively correlated with poverty rates. These findings thus support the hypotheses that the increase of these control variables (GRDP per capita, literacy rates, and road length) leads to reductions of the poverty rates.

Moreover, the benefits of reducing input tariffs to reduce poverty are larger in districts that have higher GRDP per capita and higher literacy rates. These findings are attributed to the fact that the interaction variable between input tariffs and GRDP per capita is significant and the interaction variable between input tariffs and literacy rates.

These findings have important implications for alleviating poverty and enhancing economic performance. Policymakers need to thoughtful when determining the import tariffs because different effects on poverty rates are observed. When a tariff is used to protect a sector or an industry, it could increase the costs in other sectors or industries. Imported goods are not only used as final consumption but also as intermediate inputs for local firms. Thus, the government should consider the differential effects of reducing input and output tariffs when promoting trade liberalization. Trade liberalization, especially input tariff reduction, could be more beneficial to the poor because it can increase employment and reduce poverty.

The results of tariff exposure for intermediate inputs indicate that Indonesia depends on imported intermediate inputs to a relatively high degree. It might be better for the government to establish policies that are expected to encourage firms to adjust their production patterns to use more domestic inputs as they would be more efficient. To sum up, maintaining an openness to trade, but not only in input goods, and the effort to develop domestic industries should be a crucial part of Indonesian growth strategy.

Acknowledgments

I gratefully acknowledge the funding received towards my study (the University of Indonesia and Ritsumeikan University) from Professional Human Resource Development (PHRD) IV. I am especially grateful to Bappenas Indonesia and Statistics Indonesia (BPS). I would also like to express my gratitude to Professor Kangkook Lee for his support, encouragement, and suggestions during the research process.

Appendix

Appendix 1. Correlation Matrix between Variables
(Poverty Headcount Index, Output Tariff, Input Tariff)

	P0	Output Tariff	Input Tariff
P0	1.0000		
Output Tariff	-0.1020	1.0000	
Input Tariff	0.1359	0.4286	1.0000

Appendix 2. Sectoral Share in Employment in Indonesia's Non-Oil/Gas Manufacturing Industry, 2010-2017

ISIC	Subsector	2010	2011	2012	2013	2014	2015	2016	2017
15	Manufacture of Food Products	15.01	16.03	17.95	18.01	16.94	16.35	17.52	15.77
15	Manufacture of Beverages	0.86	0.93	0.95	1.03	1.02	1.14	1.52	1.42
16	Manufacture of Tobacco Products	7.33	6.57	6.59	7.25	6.87	6.60	4.69	4.89
17	Manufacture of Textiles	10.73	10.31	9.79	9.55	10.56	9.79	8.46	9.83
18	Manufacture of Wearing Apparel	11.74	12.14	12.18	11.42	12.29	13.04	14.36	12.97
19	Manufacture of Leather and Related Products and Footwear	5.20	5.34	5.20	5.33	5.39	5.98	6.26	6.44
20	Manufacture of Wood and of Products of Wood	4.91	4.59	4.57	4.59	4.40	4.63	4.80	4.33
21	Manufacture of Paper and Paper Products	2.81	2.84	2.62	2.72	3.49	2.54	2.53	2.57
22	Manufacture of Paper and Paper Products	0.95	0.99	1.06	1.03	0.97	1.04	1.38	1.26
23	Manufacture of Coal and Refines Petroleum Products	0.14	0.13	0.13	0.13	0.12	0.14	0.31	0.36
24	Manufacture of Chemicals and Pharmaceuticals and Botanical Products	3.38	3.50	3.75	4.06	3.73	3.69	3.67	3.54
24	Manufacture of Chemicals and Pharmaceuticals and Botanical Products	1.41	1.46	1.29	1.22	1.12	1.11	1.42	1.33
25	Manufacture of Rubber, Rubber Products, and Plastic Products	7.94	7.70	7.17	7.31	7.54	8.45	7.18	7.56
26	Manufacture of Other Non-Metalic Mineral Products	3.75	3.78	3.92	3.64	3.42	3.55	3.24	3.39
27	Manufacture of Basic Metals	1.52	1.40	1.23	1.46	1.41	1.31	2.26	1.88
28	Manufacture of Fabricated Metal Products, Except Machinery and Equipment	3.45	3.34	3.28	3.46	3.10	2.98	2.65	3.01
29	Manufacture of Machinery and Equipment	0.88	1.05	1.15	1.17	1.19	1.35	1.21	1.61
29	Manufacture of Machinery and Equipment	0.42	0.41	0.36	0.35	0.37	0.26	0.67	0.59
30	Manufacture of Office, Accounting, and Computing Machinery	3.65	3.55	3.22	3.01	2.80	2.94	2.36	2.83
31	Manufacture of Electric Machinery and Apparatus	2.22	2.34	2.34	2.38	2.41	1.98	2.31	2.25
34	Manufactured of Motor Vehicles, Trailers, and Semi-Trailers	2.12	2.41	2.41	2.76	2.70	2.81	3.18	3.54
35	Manufacture of Other Transport Equipment	1.75	1.84	1.73	1.73	1.74	1.96	2.16	2.16
36	Furniture and Other Manufacturing	4.44	4.13	3.86	3.30	3.32	3.19	2.86	3.20
36	Furniture and Other Manufacturing	3.36	3.22	3.25	3.07	3.09	3.17	3.00	3.26
Total		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

References

Adha, M. A., Nahar, F. H., & Azizurrohman, M. (2018). The Impacts of Trade Liberalization on Poverty Reduction in Indonesia. *Jurnal Ekonomi Dan Pembangunan*, *19*(2). https://doi.org/https://doi.org/10.18196/jesp.19.2.5009

Amiti, M., & Konings, J. (2007). Trade Liberalization, Intermediate Inputs, and Productivity: Evidence from India. *American Economic Review*, *95*(7). https://doi.org/10.1257/aer.97.5.1611

Appleyard, D., Field, A., & Cobb, S. (2006). *International Economics*. Boston: McGraw-Hill/Irwin.

Attanasio, O., Goldberg, P., & Pavcnik, O. (2004). Trade Reform and Wage Inequality in Colombia. *Journal of Development Economics*, *74*(2). https://doi.org/https://doi.org/10.1016/j.jdeveco.2003.07.001

Bhattacharyya, S., & Resosudarmo, B. (2015). Growth, Growth Accelerations, and the Poor: Lessons from Indonesia. *World Development Volume*, *66*.

https://doi.org/https://doi.org/10.1016/j.worlddev.2014.08.009

Edmonds, E. V., Pavcnik, N., & Topalova, P. (2010). Trade Adjustment and Human Capital Investments: Evidence from Indian Tariff Reform. *American Economic Journal: Applied Economics*, *2*(4). https://doi.org/10.1257/app.2.4.42

Goldberg, P., & Pavcnik, N. (2005). Trade, Wages, and the Political Economy of Trade Protection: Evidence from the Colombian Trade Reforms. *Journal of International Economics*, *66*(1). https://doi.org/https://doi.org/10.1016/j.jinteco.2004.04.005

Hasan, R., Mitra, D., Ranjan, P., & Ahsan, R. (2012). Trade Liberalization and Unemployment: Theory and Evidence from India. *Journal of Development Economics*, *97*(2). https://doi.org/https://doi.org/10.1016/j.jdeveco.2011.04.002

Kis-Katos, K., & Sparrow, R. (2015). Labor Markets and Trade Liberalization in Indonesia. *Journal of Development Economics*, *117*. https://doi.org/https://doi.org/10.1016/j.jdeveco.2015.07.005

Kis-Katos, Krisztina, & Sparrow, R. (2011). Child Labor and Trade Liberalization in Indonesia. *Journal of Human Resources*, *46*(4). https://doi.org/10.3368/jhr.46.4.722

Kovak, B. K. (2013). Regional Effects of Trade Reform: What is the Correct Measure of Liberalization? *American Economic Review*, *103*(5). https://doi.org/10.1257/aer.103.5.1960

McCulloch, N., Winters, L., & Cirera, X. (2002). *Trade Liberalization and Poverty: A Handbook*. London: Centre for Economic Policy Research.

Naranpanawa, A., Bandara, J., & Selvanathan, S. (2011). Trade and Poverty Nexus: A Case Study of Sri Lanka. *Journal of Policy Modeling*, *33*(2). https://doi.org/https://doi.org/10.1016/j.jpolmod.2010.08.008

Nuryitmawan, T. R. (2020). Can Credit Recipient Household Escape from Poverty? *The Journal of Indonesia Sustainable Development Planning*, *1*(3). https://doi.org/https://doi.org/10.46456/jisdep.v1i3.84

Schor, A. (2004). Heterogeneous Productivity Response to Tariff Reduction. Evidence from Brazilian Manufacturing Firms. *Journal of Development Economics*, *75*(2). https://doi.org/https://doi.org/10.1016/j.jdeveco.2004.06.003

Tambunan, T. (2008). Trade Liberalization Effects on The Development of Small and medium-sized Enterprises in Indonesia: A Case Study. *Asia-Pacific Development Journal*, *15*(2).

Topalova, P. (2007). Trade Liberalization, Poverty and Inequality: Evidence from Indian Districts. In *Globalization and Poverty*. University of Chicago Press.

Winters, L., & Martuscelli, A. (2014). Trade Liberalization and Poverty: What Have We Learned in a Decade? *Annual Review of Resource Economics*, *6*. https://doi.org/https://doi.org/10.1146/annurev-resource-110713-105054

Zuhdiyaty, N., & Kaluge, D. (2018). Analisis Faktor-Faktor yang Mempengaruhi Kemiskinan di Indonesia Selama Lima Tahun Terakhir. *Jurnal Ilmiah Bisnis Dan Ekonomi Asia*, *11*(2). https://doi.org/https://doi.org/10.32812/jibeka.v11i2.42

Vol. 2 No. 1- April 2021

E-ISSN: 2722-0842 | P-ISSN: 2721-8309

Available online at
http://journal.pusbindiklatren.bappenas.go.id/

Policy Paper

Land Value Capture as Financial Resource for Infrastructure Development in Palembang City

Mabrurotunnisa[1*], Doddy Aditya Iskandar[2]

[1]Regional Development Planning Board, Research and Development of Lubuklinggau, Lubuklinggau, Indonesia
[2]Gadjah Mada University, Yogyakarta, Indonesia
Email: [1]mabrurotunnisa89@gmail.com, [2]doddy@ugm.ac.id.

) Corresponding author

ABSTRACT

Indonesian local governments still depend on the state budget to fund infrastructure development. On the other hand, land value capture (LVC) is suitable for developing countries, such as Indonesia, to fund such development. However, there is an absent legal system to explicitly implement LVC in Indonesia. This paper aims to discuss factors affecting LVC implementation in the context of Palembang. Through an in-depth interview with several experts, the study identified existing issues affecting LVC implementation including delays in revising regulation; risk of corruption, collusion, and nepotism; decrease in public participation; and public complaints due to property tax increase. Finally, we proposed strategies that should be fulfilled by the local government for the successful implementation of LVC in Palembang. They include the establishment of an implementing agency with a clear division of role and skillful members, the enactment of specific regulations, and the establishment of a special forum, e-platform, and mass media.

Keywords: land value capture, infrastructure, financing, land use, Palembang

ARTICLE INFO

Received: November 15, 2020
Received in revised form: March 12, 2021
Accepted: April 26, 2021

doi: 10.46456/jisdep.v2i1.96

JISDeP - The Journal of Indonesia Sustainable Development Planning
Published by Centre for Planners' Development, Education, and Training (Pusbindiklatren), Ministry of National Development Planning/ National Development Planning Agency (Bappenas), Republic of Indonesia

Address: Jalan Proklamasi 70, Central Jakarta, Indonesia 10320
Phone: +62 21 31928280/31928285
Fax: +62 21 31928281
E-mail: journal.pusbindiklatren@bappenas.go.id

Supported by Indonesian Development Planners Association (PPPI)

1. Introduction

The local governments are severely facing fiscal constraints, such as weak bond markets and heavy debt, that restrict them from funding infrastructure development (Mathur, 2015, 2019; White & Wahba, 2019) and depend on the state budget to fund such development. Thus, they need to seek alternative sources to fund infrastructure development (Li & Love, 2020; Mathur, 2014, 2019; Mittal, 2014). The local government uses Land Value Capture (LVC) as an alternative financial scheme for urban rail transit projects (Luan et al., 2014; Sharma & Newman, 2018). LVC is also suitable for developing countries that still face financial constraints (Suzuki et al., 2015), decreasing demand for debt and debt service risk (Peterson, 2009). Governments in other countries, such as Japan (Suzuki et al., 2015), the United States (Zhao et al., 2010), and Hong Kong (Yau, 2012), already fund large projects through LVC mechanisms. In contrast, the Indonesian local government still depends on the state budget instead of an LVC scheme. For example, in the development of light rail transit (LRT) in Palembang, South Sumatera, the state government spent IDR 12.5 trillion for its construction (*Komite Percepatan Penyediaan Infrastruktur Prioritas* - Committee for the Acceleration of Priority Infrastructure Provision, n.d.).

The debate on how to optimize public service provisions, such as financing mechanisms, identification of alternative financing sources, and the involvement of the private sector in the provisioning process, cannot be separated from the emergence of rational choice or public choice theory. The public choice theory posits that the interaction between the local government and the community is akin to the interaction between producer and consumer (Buchanan, 1969; Buchanan & Tullock, 1962; Ostrom & Ostrom, 2004; Tiebout, 1956). Local government is perceived to be able to produce a bundle of public services, and this bundle of services is then offered to the consumer willing to purchase such services (Eisinger, 1988; Ostrom & Ostrom, 2004). Community members appraise and value the quantity and quality of public services provided by the local government according to their preferences and willingness to pay. Community member purchases the whole or part of the bundle of services through their willingness to pay taxes (especially property taxes).

This idea culminates in the form of entrepreneurial government, in which government behaves and acts similar to the private sector (Osborne & Gaebler, 1992). This does not mean that government focuses its activities on creating profit-making; instead, the government utilizes principles such as value for money and public sector comparator to produce effective and efficient public services (Eisinger, 1988; Weiss, 2014). This paradigm shift affects the way government approaches its strategy, including its view of creating infrastructure, which is considered a capital-intensive project. Instead of providing infrastructure through a sunk-cost perspective, the government is encouraged to also capture the financial and economic benefits accrued from the development of infrastructure. Governments as citizens' partners develop more innovative financing methods to provide more effective and efficient public services (Osborne & Gaebler, 1992). In financing urban infrastructure, such innovation will improve the government's financial ability to fund infrastructure development (Kim, 2016; Medda, 2012). Governments are urged to be more self-resilient and cooperate with the private sector (Kim, 2016).

On the other hand, land value around some stations increased significantly during the development of LRT in Palembang (from 2015 to 2018). For instance, the land value zone (*Zona Nilai Tanah* - ZNT) around Bumi Sriwijaya Station experienced an average increase of 147 percent from 2015 to 2017 (The Palembang National Land Agency (Cartographer), 2015, 2017). The idea of value capture is based on the principle of beneficiary charges in transportation finance (Abelson, 2018; Suzuki et al., 2015) that highlight the importance of public-private partnerships (Medda, 2012). They believed that governments should involve a group of beneficiaries such as landowners and developers. LVC as an alternative financing scheme by Sustainable Development Goals (SDGs) Target 17.16 and 17.17 promote multi-stakeholder partnerships to achieve SDGs Target 9.1. and 11.2, which encourage quality public infrastructure and expand public transport.

By considering the concept of value capture, where the government can capture land value increment around transit nodes (Mathur, 2019; Smolka, 2013; Suzuki et al., 2015) caused by transport investments (Mathur, 2014), the municipal government can fund infrastructure development in Palembang through LVC scheme. Even though LVC instruments, such as tax, planning gain, betterment levy, and development impact fee, have been implemented in Indonesia, it has not fully fulfilled the value capture principles (Wisnu, 2019). Moreover, an absence in the legal system prevents the local government from explicitly implementing LVC in Indonesia.

Studies about LVC can be discussed quantitatively or qualitatively. In quantitative research, researchers generally evaluated the LVC implementation throughout the world, such as London (Roukoni & Medda, 2012), China (Wu et al., 2018), and Hong Kong (Loo et al., 2018). Some went on to calculate and forecasting value that governments could capture from land value increment (Berawi et al., 2019; Falcocchio et al., 2018; Higgins, 2019; Sharma, 2018; Sharma & Newman, 2018; Xu et al., 2019). Qualitative research primarily evaluated the LVC implementation through document reviews (Budiati, 2020; Mathur, 2014, 2015, 2017, 2019; Yilmaz et al., 2015) and specifically, based on the general principle of public finance (Abelson, 2018; Gielen & Mualam, 2019; Roukoni & Medda, 2012; Zhao et al., 2010; Zhao & Larson, 2011). Other research identified the opportunities for LVC implementation through a comprehensive review of the literature (Salon & Shewmake, 2011) and by comparing case studies (Neville, 2016). Nevertheless, very few researchers conducted LVC through in-depth interviews and focused group discussion (Gunawan & Berawi, 2018; Yau, 2012) because they are more time-consuming and challenging to draw a consensus. Moreover, few studies discuss the opportunity for LVC implementation in Indonesia (Gunawan & Berawi, 2018; Wisnu, 2019).

Numerous studies have explored LVC implementation worldwide. The following studies provide an understanding of preconditions for the success of LVC implementation: institutional and regulatory readiness and public acceptance. In implementing LVC tax-based instruments, it is necessary to establish supportive regulation (Zhao & Larson, 2011) such as a clear mechanism in a jurisdiction (Kerth & Baxandall, 2011; Zhao et al., 2010) and strong government institutions at the state-level and city-level (Mathur, 2014). Moreover, tax-based instruments require a robust real estate market, updated and accurate cadastral data, strong coordination among stakeholders, and support from property owners (Abelson, 2018; Mathur, 2014, 2017; Mathur & Smith, 2012; Zhao & Larson, 2011).

In the same way, studies found that in implementing LVC development-based instruments, it is important to have adequate institutional and regulatory support (Gielen & Mualam, 2019; Mathur, 2015; Mittal, 2014; Suzuki et al., 2015; Zhao et al., 2010). Government officials should have high technical knowledge and management skills (Aveline-Dubach & Blandeau, 2019). The local government also needs to establish effective and efficient land development control such as cadastral data (Gielen & Mualam, 2019) and provide a stronger incentive mechanism (Suzuki et al., 2015) by creating well-functioning financial institutions (Kim, 2018). Some scholars also highlight the importance of achieving stakeholders consensus and coordination (Zhao et al., 2010) by conducting public forums (Yau, 2012), creating a transparent project scheme (Yilmaz et al., 2015), and a clear division of stakeholders' roles (Yilmaz et al., 2015), and providing knowledge to landowners and developers (Suzuki et al., 2015; Yau, 2012). Furthermore, a significant land value increase and a robust real estate market (Aveline-Dubach & Blandeau, 2019; Gielen & Mualam, 2019; Kim, 2018; Mathur, 2015; Mittal, 2014) are also essential for the successful implementation of development-based instruments.

In this paper, we discussed factors affecting LVC implementation in the context of Palembang. The study used an in-depth interview with possible experts for LVC implementation in Palembang. Finally, we propose strategies to strengthen the enabling factors as a material consideration for the local government to implement LVC in Palembang.

2. Methodology

This paper involves a qualitative approach to discover the opinions and thoughts of the participants. This paper used in-depth interviews to understand the rationale of LVC implementation, which is difficult to capture through a quantitative study. As a sampling method, we used purposive sampling to explain research questions in information-rich cases (Creswell, 2009; Patton, 2002). We interviewed seven experts who are knowledgeable about land regulation, property taxation, and public-private partnerships in Palembang and understand LVC instruments.

Before the interview, we conducted a systematic review of several types of research to find the determinant factors of the success of LVC implementation throughout the world. The eligibility criteria of the references include topic, type of publication, year of study, language, academic field, and context (Permana & Harsanto, 2020). This paper utilized two keywords: "infrastructure financing" and "land value capture" in the search engine because value capture is a form of infrastructure financing innovation. We limited the type of publication to English publications that consist of peer-reviewed articles, proceedings, government reports, books, and working papers. We then sorted the articles by the academic fields related to land use, transportation, and urban planning. We downloaded, read, and analyzed the publication published in the last ten years to obtain more relevant conditions about LVC implementation.

We compared the publications by countries and LVC instruments. As a review framework, we grouped the findings into three thematic analyses: institutional, actors' support, and prerequisites.

Based on the systematic review of other countries' experiences with LVC, we concluded that key factors in LVC implementation consist of a strong institution, regulation, stakeholder consensus, and real estate market. Therefore, we focused the interview on two major topics: institutional and regulatory readiness and public acceptance. The objective of the interview is to obtain information from participants about enabling factors and hindrances that potentially affect the implementation of LVC instruments in Palembang. Thus, we developed the interview guideline that listed questions related to regulation, government institutional structure, public-private partnership, LRT development, and LVC implementation.

We considered that the background characteristics of the participants might influence the results. Thus we divided the participants into two groups: 1) Local government officials group that consists of representatives from Regional Development Planning Board Research and Development or (Bappeda Litbang), the Public Works and Spatial Planning Agency or (DPUPR), and the Regional Tax Management Agency (BPPD); and 2) Private sector and civil society group that consists of members of Association of Indonesian Housing and Settlement Developers (APERSI), a residential property owner, and a commercial property owner.

We conducted all interviews by voice call through a multiplatform messenger such as WhatsApp after we delivered a brief overview of LVC instruments to the participants through the same multiplatform messenger. We recorded, transcribed, and translated the interviews with participants' permission. Based on the interview transcription, we highlighted significant statements and quotes (Creswell & Poth, 2018) that reveal how the participants act towards the phenomenon discussed in this paper. We cross-checked the information from the interview with government policies and documents to interpret the results. Thereby, we discovered more findings that are not stated in previous studies or previously conducted interviews. We later transformed those findings into several themes and delivered them into structural descriptions that show the essence of the phenomenon that was being studied (Creswell & Poth, 2018). Finally, this paper proposes several solutions to deal with existing barriers and strengthen the existing enablers for successful LVC implementation in Palembang.

3. Result and Discussion

The following discussions revealed four main existing features that may strengthen LVC implementation, including the existence of regulations related to land use, property tax, public-private partnerships, clear division of authority in governance structure, effective coordination among stakeholders, and robust real estate market. We discovered several issues arising in the four key factors, including delays in revising regulation, risk of corruption, collusion, nepotism, decreased public participation, and public complaints due to property tax increase.

Most informants admitted that to succeed in LVC implementation in Palembang, the local government must guarantee that the existing local regulations (land use, property taxation, and public-private partnership regulations) are sufficient. One of their statements illustrated this point. A former secretary of a planning agency stated, "for land use, we [Palembang municipal government] has 2012-2032 regional spatial planning (RTRW), which is currently in the process of revision." However, she unwittingly revealed the surprising current situation of RTRW: the revising process of the regulation is delayed.

Even though she believed that "there are no obstacles [in the implementation of RTRW] because every stakeholder is already in agreement regarding the zones that have been regulated," the outdated regulation might affect LVC implementation in the future. In relation to this, a government official of a spatial planning agency argued that "spatial planning is dynamic, [therefore] spatial planning regulation has to be revised every five years." These findings aligned with Law No. 26/2007 about spatial planning that obligates each region to conduct a judicial review regarding RTRW. These findings also support previous research that acknowledged the essence of effective and efficient land development control in LVC implementation (Gielen & Mualam, 2019; Zhao & Larson, 2011).

The researcher also believes that supporting regulations in LVC implementation is not only about their existence but also their clarity in the jurisdiction (Kerth & Baxandall, 2011; Zhao et al., 2010). This clarity might influence stakeholders' behaviors towards government actions. Following this argument, a government official, for example, described, "even though there were complaints from the public

regarding the length of time for the permit [building permit] process, it has been resolved through the implementation of standard operating procedure (SOP) of the permits." This SOP shows that the process of applying for a building permit (*Izin Mendirikan Bangunan* - IMB) can be finalized in less than four hours. However, there might be a delay, revision, or refusal from the authorized officer during the permit process.

At the same time, the authorizing process still involves face-to-face interaction between government officials and citizens that may increase the risk of corruption, collusion, and nepotism (KKN) during the process. Budiati (2020) believed that the practice of bribery might occur between private contractors and public officers; as a consequence, the competition among bidders (i.e., contractors) would be unfair. This issue could be resolved using the online application. A government official from the public works agency believed that "through the Electronic Goods and Services Procurement (LPSE) system, the private sector does not need to come face to face with the government but through the website where they can avoid KKN." However, there is still uncertainty of clean governance because there is still a chance for both parties (the private sector and the government officials) to communicate outside the LPSE procedure.

The former secretary of the planning agency also believed that "clear division of authority among institutional structures of Palembang municipal government" is the key factor for successfully implementing several regulations, such as land use, property tax, and public-private partnership, in Palembang. The authority of the institutional structure of each agency in Palembang municipal government is regulated under major regulations about the positions, organizational structures, duties and functions, and work procedures of each agency. However, this changes many times due to changes in nomenclature, causing a transition in an agency's authority and function, as illustrated by the following statement of a government official:

> RTRW was planned by Bappeda [Regional Development Planning, Research, and Development Agency or Bappeda Litbang] because it is related to spatial planning. Bappeda was intensively communicating with people who want to get information related to the function of space. But now, the authority is transferred to DPUPR. However, Bappeda is still the coordinator; for example, during the revision of RTRW, Bappeda is still involved in the process at the regional level, provincial level, and national level.

The authority of spatial planning was transferred from Bappeda Litbang to DPUPR based on Mayor Regulation Number 50/2016 about the Position, Organizational Structure, Duties, and Functions, and DPUPR's Work Procedures. This circumstance urged DPUPR, as a new responsible agency, to ensure that they can carry out these new tasks through adequate financial resources and skillful government officials. A possible interpretation arises that such kind of government structure reform hindered the process of RTRW revision. This finding is in line with those findings by Aveline-Dubach & Blandeau (2019), who highlighted the urgency of having high technical government officials.

Most participants also acknowledged the critical role of dissemination to achieve stakeholders' consensus. A government official from the tax agency revealed that by "conducting dissemination to the public up to the lowest economic level about how important the role of the community is in regional development in particular," government could increase taxpayer awareness. Dissemination through various public forums and meetings can captivate stakeholders to participate in the development process through which they will obtain detailed information about government programs. The implementation of tax object sales value (NJOP), for example, involves a long dissemination process to respond to public complaints regarding NJOP adjustment through Mayor Regulation No. 51/2019 about Land and Building Tax Stimulant, which was introduced in July 2019.

Another respondent supported this statement. The former secretary of the planning agency illustrated several coordination schemes that accommodate cooperation among the government, the private sector, and civil society.

> The official mechanism [to attract the participation of the private sector and civil society] is Musrenbang [the development planning forum]. In these forums, the municipal government invites the private sector through CSR [Cooperate Social Responsibility] forum. The private sector can get information about government programs before making decisions about which programs they are willing to help. Also, DPMPTSP [the Capital Investment and One-Stop Integrated Services Agency] actively conduct roadshow from event to event to offer cooperation in Palembang.

Musrenbang may be the biggest public forum at the municipal level through which stakeholders convey their aspirations, expecting realization in the next financial year. The literature also supports these findings. Yau (2012) suggests that public forums are important to achieve stakeholder consensus and create strong coordination. Unfortunately, data shows that the government cannot achieve the public

proposal's target in 2019 (Public Works and Spatial Planning Agency, 2019). This may indicate that there is a weakness in the government's financial ability, so the government needs to prioritize the urgent and impactful public proposal. It may affect public awareness and decrease public participation in the development process.

Another important finding is that there is a potentially strong real estate market. This finding is in line with the arguments made by Mittal (2014), Mathur (2015), Kim (2018), Aveline-Dubach & Blandeau (2019), and Gielen & Mualam (2019). They suggest that significant land value increases and a robust real estate market are essential for the success of LVC implementation. A strong real estate market indicates a strong supply and demand for property. A member of developer associations, for instance, disclosed that "business [property business life] experienced an improvement due to an increase in selling prices of land and property." He interpreted that his company benefits from such increment even though the increase in property selling prices is probably is caused by the increase in property tax due to the NJOP adjustment in 2019. This interpretation would be consistent with government documents that found an increasing number of housing demands from citizens. See Government Agency Work Report (*Laporan Kerja Instansi Pemerintah* - LKjIP) of DPUPR (2019). From the government's point of view, this may be an opportunity to increase local tax revenue. On the other hand, developers may experience decline in the number of property sales because of public complaints related to property tax increases.

Even though a government official of spatial planning suggested that public complaints arise because "some people still lack understanding about zones regulation for determining property tax" and that "it is now solved because of the intense dissemination," the Regional Tax Management Agency (BPPD) revealed that they could not achieve their target of land and building tax (PBB) revenue in 2019 because some citizens objected to the new tax rate which was calculated using the NJOP adjustment (See Government Agency Work Report (LKjIP) of BPPD, 2019).

By linking findings from the previous discussion, this paper provides an overview of the enabling factors and barriers of LVC implementation in Palembang, as shown in Table 1.

Table 1: Strategies and Actions for LVC Implementation in Palembang

Enabling Factors	**Problems**	**Root Problems**	**Objectives**	**Actions**
Existing local regulation	Delay in revising regulation that causes outdated data and regulations	Change in agency authority	Skillful government officials (planners, tax analysts, and property appraisers)	1. Build the capacity of government officials on skills related to LVC implementation 2. Update cadastral data 3. Establish regulation that consists of area development, detailed procedures, and sanction. 4. Analyse costs, benefits, and risks of LVC projects
The clear mechanism of the jurisdiction (e.g., implementation of standard operating procedures of permits)	Risk of corruption, collusion, nepotism	Face-to-face interaction	Increase public trust	1. Build e-platform as information, consultation, and transaction media 2. Publish information through e-platform and/or mass media 3. Submit progress report through e-platform
Clear division of authority	Change in agency authority	Nomenclature changes	Skillful government officials	1. Establish the implementing agency 2. Build the capacity of government officials on skills related to LVC implementation

Effective coordination among stakeholders	Decrease in public participation	Weak government financial ability	Stakeholders' support	1. Establish a special public forum for the LVC project 2. Conduct intensive dissemination 3. Conduct intensive public forum with stakeholders
Strong real estate market	Public complaints due to property tax increase	NJOP adjustment	Stakeholder's support	Conduct intensive dissemination

Source: Authors' analysis, 2020

Table 1. proposed several actions that the local government should be fulfilled to address the issues. Firstly, the local government needs to establish a strong implementing agency of LVC with a clear division of roles among related agencies and skillful members. The implementing agency may update cadastral data and property value to have a more accurate analysis before analyzing the costs, benefits, and risks of LVC projects. This action may require high technical skills of government officials; therefore, capacity building is also important to achieve the goal. On the other hand, revaluation of the property value will cause changes in property taxes and raise public objections. Therefore, the implementing agency needs to conduct intensive dissemination before executing LVC projects to gain consensus.

Second, the local government needs to enact regulation that consists of establishing area development, detailed procedures, and sanctions. Because property tax falls under the authority of local governments, it will be easier to implement regulations. After stakeholders reach a consensus, the government may enact the regulations, start the LVC project, and develop the facilities. The implementing agency may also need to establish a special public forum in which property owners and other stakeholders convey their concerns, suggestions, and objection regarding the LVC projects.

Third, to increase public trust, the implementing agency can build an electronic platform (e-platform) to deliver more transparent information and effective media consultations between the private sector and public societies with the local government. The e-platform can also function as a media of transaction where developers can buy such property development rights. To monitor the implementation process, representatives of each stakeholder must submit a progress report of implementing the LVC project through the e-platform to overcome frequent changes in the agencies' authority. Using this progress report, if a task changes, the new person responsible for that task can get input on how to carry out the new tasks. Apart from e-platform, it is also important to disseminate information about the progress of the LVC project through the mass media.

Conclusion

By conducting qualitative research in Palembang, this paper identified a list of enabling factors and barriers that may influence the implementation of LVC in the future. Even though some precondition for LVC implementation already existed, the local government need to improve and strengthen many features to succeed LVC implementation in Palembang. We argued that before LVC implementation, it is essential to establish an implementing agency of LVC that functions to conduct plan, construct, and monitor LVC projects. Furthermore, achieving a public consensus and increasing public trust is also important because the LVC projects involve various stakeholders from different groups.

This paper involved in-depth interviews with several experts who represent different groups with different backgrounds. However, to cross-check the validity and reliability of the information, the researcher only compared it with secondary data to confirm the interview results. Further research is needed to investigate these issues using a mixed-method approach, combining the interview with a quantitative survey. Future research may also include calculating the benefits from LVC projects. Also, the proposed strategies can be developed in more detail by interviewing other related participants from different agencies, such as the transportation agency and land agency. However, this method is rather time-consuming.

Acknowledgments

We would like to express our gratitude to Professor Toshihiro Kudo of GRIPS, Palembang Municipal government, all participants, and informants involved in this research.

References

Abelson, P. (2018). Analysis of Value Capture Instruments. *Economic Papers*, *37*(4), 399–411. https://doi.org/10.1111/1759-3441.12234

Aveline-Dubach, N., & Blandeau, G. (2019). The Political Economy of Transit Value Capture: The Changing Business Model of the MTRC in Hong Kong. *Urban Studies*, *56*(16), 1–17. https://doi.org/10.1177%2F0042098018821519

Berawi, M. A., Suwartha, N., Salsabila, F., Gunawan, Miraj, P., & Woodhead, R. (2019). Land Value Capture Modeling in Commercial and Office Areas Using a Big Data Approach. *International Journal of Technology*, *10*(6), 1150–1156. https://dx.doi.org/10.14716/ijtech.v10i6.3640

Buchanan, J. (1969). *Cost and Choice: An Inquiry in Economic Theory*. Liberty Fund.

Buchanan, J., & Tullock, G. (1962). *The Calculus of Consent: Logical Foundations of Constitutional Democracy*. Liberty Fund.

Budiati, L. (2020). Building the Integrity of Urban Development Planner Through Corruption Risk Management and Assessment: Literature Review. *The Journal of Indonesia Sustainable Development Planning*, *1*(1), 83–104.

Creswell, J. W. (2009). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches (3rd ed.)*. Sage Publications, Inc.

Creswell, J. W., & Poth, C. N. (2018). *Qualitative Inquiry and Research Design: Choosing Among Five Approaches (4th ed)*. Sage Publications, Inc.

Eisinger, P. K. (1988). *The Rise of the Entrepreneurial State: State and Local Economic Development Policy in The United States*. University of Wisconsin Press.

Falcocchio, J. C., Malik, A., & Kontokosta, C. E. (2018). A Data-driven Methodology for Equitable Value-capture Financing of Public Transit Operations and Maintenance. *Transport Policy*, *66*, 107–115. https://doi.org/10.1016/j.tranpol.2018.02.005

Gielen, D. M., & Mualam, N. (2019). A Framework for Analyzing the Effectiveness and Efficiency of Land Readjustment Regulations: Comparison of Germany, Spain and Israel. *Land Use Policy*, *87*. https://doi.org/10.1016/j.landusepol.2019.104077

Gunawan, & Berawi, M. A. (2018). Conceptual Development of Land Value Capture (LVC) Model in Indonesia Infrastructure Project to Increase Project Benefits. *Proceedings of the International Conference on Industrial Engineering and Operations Management*, 1027.

Higgins, C. D. (2019). A 4D Spatio-temporal Approach to Modelling Land Value Uplift from Rapid Transit in High Density and Topographically-rich Cities. *Landscape and Urban Planning*, *185*, 68–82. https://doi.org/10.1016/j.landurbplan.2018.12.011

Kerth, R., & Baxandall, P. (2011). *Tax-increment Financing: The Need for Increased Transparency and Accountability in Local Economic Development Subsidies*. U.S. PIRG Education Fund.

Kim, J. (2016). *Handbook on Urban Infrastructure Finance. New Cities Foundation*.

Kim, J. (2018). *CePACs and Their Value Capture Viability in the U.S. for Infrastructure Funding* (Working Paper WP18JK1).

Komite Percepatan Penyediaan Infrastruktur Prioritas [Committee for the Acceleration of Priority Infrastructure Provision]. (n.d.). *Proyek Prioritas: KPPIP [Priority Project]: KPPIP*.

Li, X., & Love, P. E. D. (2020). Employing Land Value Capture in Urban Rail Transit Public Private Partnerships: Retrospective Analysis of Delhi's Airport Metro Express. *Research in Transportation Business & Management*, *32*. https://doi.org/10.1016/j.rtbm.2020.100431

Loo, B. P. Y., Bryson, J. R., Song, M., & Harris, C. (2018). Risking Multi-billion Decisions on Underground Railways: Land Value Capture, Differential Rent and Financialization in London and Hong Kong. *Tunnelling and Underground Space Technology*, *81*. https://doi.org/10.1016/j.tust.2018.07.011

Luan, X. F., Lin, X. B., McGuinness, E., & Yang, J. W. (2014). Emerging Public-private Partnerships in China's Rail Mass Transit Case of Shenzhen. *Transportation Research Record*, *2450*, 127–135. https://doi.org/10.3141/2450-16

Mathur, S. (2014). Special Assessment District's Ability to Fund Transit Lessons from Project-level Analysis. *Transportation Research Record: Journal of the Transportation Research Board*, *2417*, 103–110. https://doi.org/doi:10.3141/2417-11

Mathur, S. (2015). Sale of Development Rights to Fund Public Transportation Projects: Insights from Rajkot, India. *BRTS Project. Habitat International*, *50*, 234–239. http://dx.doi.org/10.1016/j.habitatint.2015.08.041

Mathur, S. (2017). Using Tax Increment Financing to Fund Public Transportation: Enabling Environment and Equity Impacts. *Public Works Management & Policy*, *22*(3), 201–225. https://doi.org/doi:10.1177/1087724X16683404

Mathur, S. (2019). An Evaluative Framework for Examining the Use of Land Value Capture to Fund Public Transportation Projects. *Land Use Policy*, *86*, 357–364. https://doi.org/10.1016/j.landusepol.2019.05.021

Mathur, S., & Smith, A. (2012). *A Decision-support Framework for Using Value Capture to Fund Public Transit: Lessons from Project-specific Analyses (Report No. 11-14)*. Mineta Transportation Institute.

Medda, F. (2012). Land Value Capture Finance for Transport Accessibility: A Review. *Journal of Transport Geography*, *25*, 154–161. http://dx.doi.org/10.1016/j.jtrangeo.2012.07.013

Mittal, J. (2014). Self-financing Land and Urban Development Via Land Readjustment and Value Capture. *Habitat International*, *44*, 314–323. https://doi.org/10.1016/j.habitatint.2014.07.006

Neville, J. T. J. (2016). *Modelling a Land Value Capture Application in Chrischurch, New Zealand*. University of Canterbury, Canterbury, New Zealand.

Osborne, D. E., & Gaebler, T. (1992). *Reinventing Government: How the Entrepreneurial Spirit is Transforming the Public Sector.*

Ostrom, E., & Ostrom, V. (2004). The Quest for Meaning in Public Choice. *The American Journal of Economics and Sociology*, *63*(1), 105–147.

Patton, M. (2002). *Qualitative Research and Evaluation Methods, 3rd edn*. Sage.

Permana, C. T., & Harsanto, B. (2020). Sustainable City Planning Concepts and Practices in Emerging Economies: A Systematic Review. *The Journal of Indonesia Sustainable Development Planning*, *1*(1), 67–82. https://doi.org/10.46456/jisdep.v1i1.32

Peterson, G. E. (2009). *Unlocking Land Values to Finance Urban Infrastructure [Adobe Digital Edition Version]*.

Public Works and Spatial Planning Agency. (2019). *Government Agency Work Report of Public Works and Spatial Planning Agency*.

Roukoni, A., & Medda, F. (2012). Evaluation of Value Capture Mechanisms as a Funding Source for Urban Transport: The Case of London's Crossrail. *Social and Behavioural Sciences*, *48*, 2393–2404. https://doi.org/10.1016/j.sbspro.2012.06.1210

Salon, D., & Shewmake, S. (2011). *Opportunities for Value Capture to Fund Public Transport: A Comprehensive Review of the Literature With a Focus on East Asia*.

Sharma, R. (2018). *Financing Urban Rail Projects through Land Value Capture –The Indian Case*. Curtin University, Perth, Australia.

Sharma, R., & Newman, P. (2018). Does Urban Rail Increase Land Value in Emerging Cities? Value Uplift from Bangalore Metro. *Transportation Research Part A*, *117*, 70–86. https://doi.org/10.1016/j.tra.2018.08.020

Smolka, M. O. (2013). *Implementing Value Capture in Latin America: Policies and Tools for Urban Development (Policy Focus Report Code PF035)*. Lincoln Institute of Land Policy.

Suzuki, H., Murakami, J., Hong, Y. H., & Tamayose, B. (2015). *Financing Transit-oriented Development with Land Values: Adapting Land Value Capture in Developing Countries [Adobe Digital Edition version]*.

The Palembang National Land Agency (Cartographer). (2015). *Land Value Zone Map (ZNT) [map]. 1:40,000.*

The Palembang National Land Agency (Cartographer). (2017). *Land Value Zone Map (ZNT) [map]. 1:10,000*.

Tiebout, C. M. (1956). A Pure Theory of Local Expenditures. *Journal of Political Economy*, *64*(5), 416–424.

Weiss, M. (2014). *"Government Entrepreneur" is Not an Oxymoron*. Harvard Business Review.

White, R., & Wahba, S. (2019). Addressing Constraints to Private Financing of Urban (Climate) Infrastructure in Developing Countries. *International Journal of Urban Sustainable Development*. https://doi.org/doi: 10.1080/19463138.2018.1559970

Wisnu, L. (2019). *Value Capturing for Regional Road Development: A Responsive Institutional Design Approach for Indonesia*. University of Groningen, Groningen, Netherland.

Wu, J., Hu, Y., Tao, L., & He, Q. (2018). Value Capture in Protected Areas from the Perspective of Common-pool Resource Governance: A Case Study of Jiuzhai Valley National Park, China. *Land Use Policy*, *79*, 452–462. https://doi.org/10.1016/j.landusepol.2018.08.047

Xu, X., Wang, J., Peng, H., & Wu, R. (2019). Prediction of academic performance associated with internet usage behaviors using machine learning algorithms. *Comput. Human Behav.*, *98*.

Yau, Y. (2012). Homeowner Involvement, la, 2018nd Readjustment, and Sustainable Urban Regeneration in Hong Kong. *Journal of Urban Technology*, *19*(1), 3–22. https://doi.org/doi:10.1080/10630732.2012.626705

Yilmaz, A., Cagdas, V., & Demir, H. (2015). An Evaluation Framework for Land Readjustment Practices. *Land Use Policy*, *44*, 153–168. http://dx.doi.org/10.1016/j.landusepol.2014.12.004

Zhao, Z. J., Das, K. V., & Larson, K. (2010). Tax Increment Financing as a Value Capture Strategy in Funding Transportation. *Transportation Research Record: Journal of the Transportation Research Board*, *2187*, 1–7. https://doi.org/doi:10.3141/2187-01

Zhao, Z. J., & Larson, K. (2011). Special Assessments as a Value Capture Strategy for Public Transit Finance. *Public Works Management Policy*, *20*(10), 1–21. https://doi.org/doi:10.1177/1087724X11408923

Vol. 2 No. 1- April 2021

E-ISSN: 2722-0842 | P-ISSN: 2721-8309

Available online at
http://journal.pusbindiklatren.bappenas.go.id/

Policy Paper

Transmigration as a Strategy for Strengthening National Food Security

Mas Wedar Haryagung Adji [1*], Santi Yulianti [2], Syifaa Tresnaningrum[3], Erna Gustina Norrista[4]

[1,2,3,4] Ministry of National Development Planning/Bappenas
Email: [1] wedar@bappenas.go.id, [2]santi.yulianti@bappenas.go.id, [3]syifaa.tresnaningrum@bappenas.go.id, [4]erna.gustina@bappenas.go.id.

***) Corresponding author**

ABSTRACT

Indonesia is one of the largest agricultural countries in Southeast Asia, but it is also struggling with food security issues. The government's challenge is to ensure that domestic food needs are fulfilled. The covid-19 pandemic exacerbated this challenge, where countries faced the threat of food shortages due to limited movement of goods. Thus, Indonesia should focus on increasing the production and productivity of strategic food commodities. One of the alternative solutions is through the transmigration program. This research focused on how the transmigration program can contribute to food security. The study was carried out through a descriptive qualitative method. The result shows that transmigration contributes to food security because of its similarity to the food production process. However, this program faces five main challenges to support food security. Therefore, this study shows several pre-conditions that the government needs to fulfill to overcome these challenges.

Keywords: transmigration, food Security, regional development

ARTICLE INFO

Received: February 25, 2021
Received in revised form: April 07, 2021
Accepted: April 16, 2021

doi: 10.46456/jisdep.v2i1.110

JISDeP - The Journal of Indonesia Sustainable Development Planning
Published by Centre for Planners' Development, Education, and Training (Pusbindiklatren),
Ministry of National Development Planning/ National Development Planning Agency (Bappenas), Republic of Indonesia

Address: Jalan Proklamasi 70,
Central Jakarta, Indonesia 10320
Phone: +62 21 31928280/31928285
Fax: +62 21 31928281
E-mail:
journal.pusbindiklatren@bappenas.go.id

Supported by Indonesian Development Planners Association (PPPI)

1. Introduction

The 1945 Constitution of the Republic of Indonesia mandates that food is a basic human need, where the needs of citizens for it must be guaranteed. According to Law No. 18 of 2012 concerning food, food is anything that comes from biological sources of agriculture, plantation, forestry, fishery, animal husbandry, water, and water products, processed or unprocessed, which is designated as food or beverage for human consumption, including food additives, food raw materials, and other materials used in the process of preparing, processing, and/or making food or beverages (Republic of Indonesia, 2012).

Several issues at the national level emerged related to meeting food needs. One of them is population growth followed by an increase in the amount of food needed. Based on the 2020 Population Census results, the total population in Indonesia in September 2020 was 270.2 million, increasing 32.56 million people compared to the 2010 Population Census (Badan Pusat Statistik, 2021). By 2050, Indonesia's population will reach 322 million people, the fifth largest in the world after China, India, Nigeria, and the United States of America (United Nations, 2019). This indicates that the rapid population growth will pressure the supply of food needs, especially on the international and national food stocks.

Sustainable production of several day-to-day food commodities, such as sweet potatoes, rice, maize, soybeans, eggs, meat, and chicken, determines food availability (Food and Agriculture Organization, 2020). For example, as one of the staple food sources, corn has become the commodity with the highest production for the last ten years. Meanwhile, rice production tends to fluctuate every year. The weather factors that occur in several areas, such as La Nina and the relatively low precipitation, cause adverse food production stocks. This will also affect the price index of these food commodities, as shown in Figure 1 below.

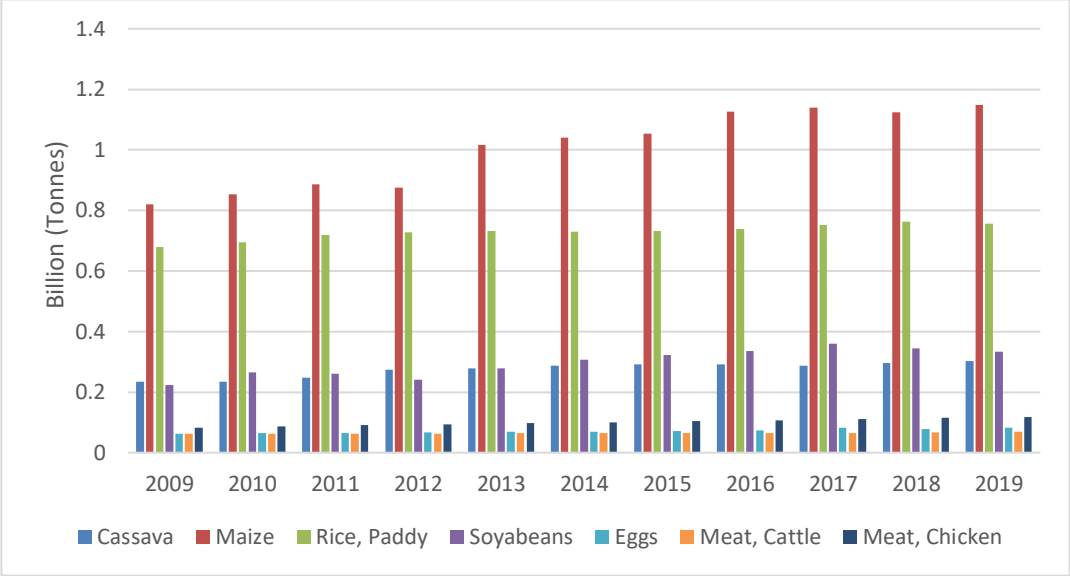


Figure 1. Production of Several World Food Commodities (Tons)
Source: FAO, 2020

When viewed from the development of the price index of several world food commodities in the period of 10 years (2009-2020), the Food Commodity Index averaged 113.3% (January 2021), 4.3% higher than in December 2020 (Food and Agriculture Organization, 2020). This indicates an increase for eight consecutive months and is the highest monthly average since July 2014. Several commodities also increase in the commodity price index, such as vegetable oil, cereals, and sugar (Food and Agriculture Organization, 2020). Thus, an increase in commodity prices may indicate scarcity in the production or distribution of food commodities both in the Southeast Asian region and on the global scale. This can be seen in Figure 2 below.

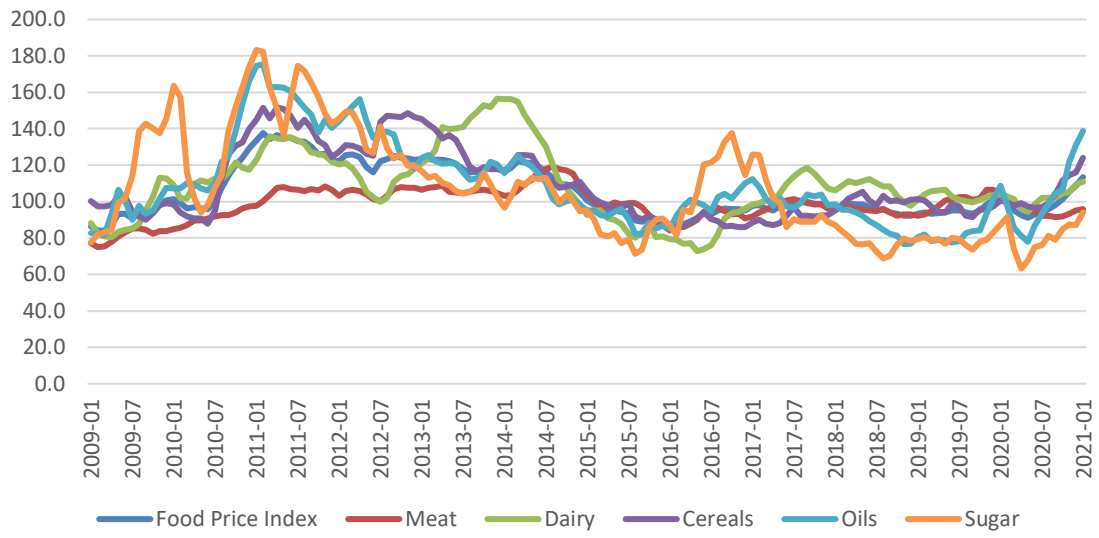


Figure 2. Development of Food Commodity Price Index (2009-2020)
Source: FAO, 2020

Regarding price dynamics for international rice commodities in the Southeast Asia region, price data from Thailand, Vietnam, and Indonesia are used. These countries are the major rice exporters in the Southeast Asia region. Thai and Vietnamese rice prices are relatively lower than Indonesian rice prices (Food and Agriculture Organization, 2020). Internal and external factors can influence the high price of rice in Indonesia. The development of the three countries' rice prices can be seen in Figure 3 below.

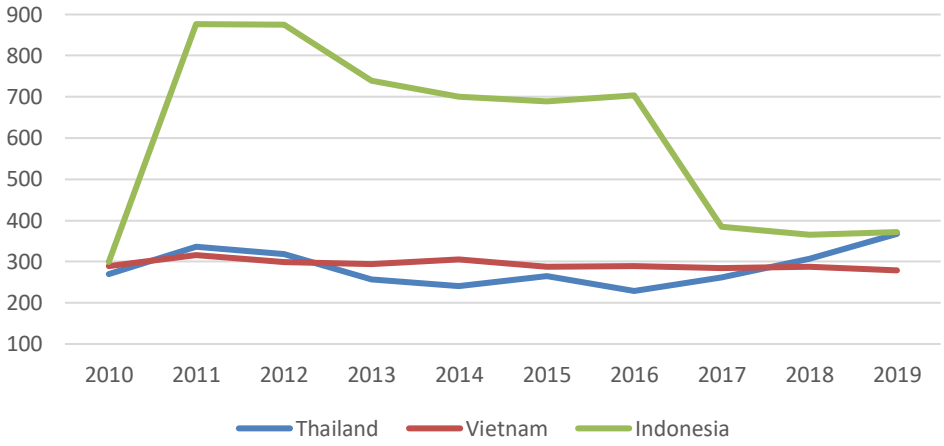


Figure 3. Southeast Asian Rice Producer Prices (USD / Ton)
Source: FAO, 2020

There are ten countries as the largest rice producers in the world (Food and Agriculture Organization, 2020). In the 1994-2019 period, Indonesia occupied the third position as the largest rice producer. Southeast Asia region's rice exports have an important contribution to world rice exports. This condition influences the rice prices in Southeast Asia and worldwide. The rice growth in Indonesia is predicted to be negative because Indonesia may experience erratic rain and a changing or delayed planting season (Food and Agriculture Organization, 2020). This can be seen in Figure 4 below.

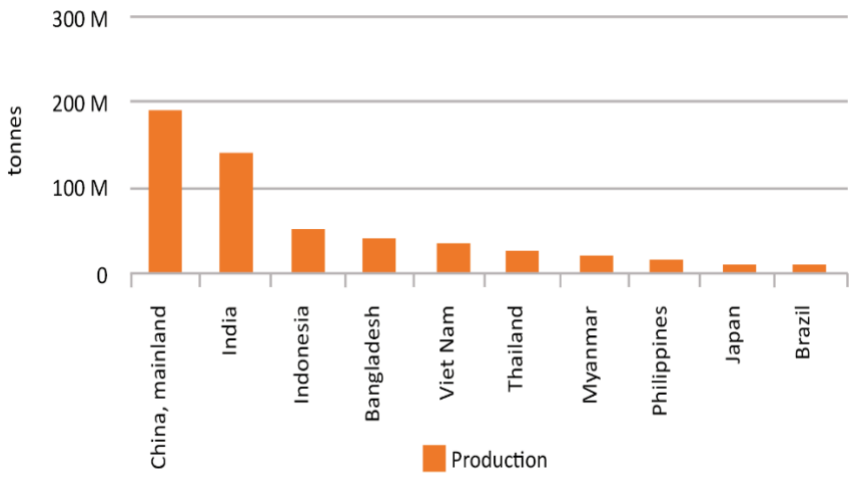


Figure 4. Ten Largest Rice Producing Countries in the World (1994-2019 Average)
Source: FAO, 2020

Besides that, the covid-19 pandemic intensifies food shortage that triggers price rises. The lockdown applied tightly in some countries has caused food distribution problems (Toffolutti, Stuckler, & McKee, 2020). As a result, limited food can be traded to other countries. The international food distribution problem also affects food availability in Indonesia since only limited food can be imported (Amanta & Aprilianti, 2020). To limit the spread of the covid-19 virus, people mobility restriction is also ordered in Indonesia starting in April 2020 (Sutrisna, 2020). This restriction disrupts food distribution (Masniadi, Angkasa, Karmeli, & Esabella, 2020). People living in the city buy food at higher prices due to food scarcity. On the other hand, farmers hardly sell their harvested products to consumers affecting prices at the farmer level.

According to Law Number 17 of 2007 concerning the National Long-Term Development Plan (RPJPN) 2005-2025 and Presidential Regulation Number 18 of 2020 concerning the National Medium-Term Development Plan (RPJMN) 2020-2024, food should be provided to the public as a form of domestic food security (Republik Indonesia, 2017). The urgency of food security is also mentioned in Presidential Regulation No. 86 of 2020 concerning the Government Work Plan (RKP) 2021 as one of Indonesia's development focus in 2021 and is in line with the recovery of the industry, tourism, and investment (Republic of Indonesia, 2020). Strengthening food security is expected to support the achievement of First National Priority's target in Strengthening Economic Resilience for Quality and Equitable Growth.

According to Law No. 18 of 2012 concerning food, food security is defined as "a condition to fulfill food by the state to individuals, which is reflected in the availability of sufficient food both in quantity and quality, safe, diverse, nutritious, equitable, and affordable food and does not conflict with the community's religion, belief and culture, in order for the community to live healthily, be active and productive in a sustainable manner" (Republic of Indonesia, 2012). Thus, the government is obliged to meet food demand by regulating, developing, and allocating agricultural land and water resources, eliminating various policies that affect declined competition providing counseling and assistance, making budget allocations, and developing and disseminating science and technology to increase food production. Central governments and local governments should facilitate the use and development of facilities and infrastructure to increase food production and develop community food institutions.

Food production should be sustained to anticipate food crises. Transmigration areas are alternative areas that can provide food for their people. The transmigration area is estimated to meet around 28 percent of the total national rice demand from 3,650 thousand hectares of land (Pribadi, 2020). Thus, food production in the transmigration areas should be developed to strengthen food security in Indonesia. The transmigration role in supporting food security is in line with the purpose of transmigration as a regional development approach as stipulated in Law No. 29 of 2009 concerning transmigration. Thus, transmigration is meant to move people from densely populated areas to areas that are still lacking in population and a new way for people to improve their welfare and an effort to build food security

(Nugraha, Hasan, & Samantha, 2015). However, transmigration may face several problems in order to strengthen food security. The conversion of agricultural land (Dirman, Saleng, & Sapiddin, 2018), aging farmers (Rigg, Phongsiri, Promphakping, Salamanca, & Sripun, 2020), soil degradation (Gomiero, 2016), and climate change (Syaukat, 2011) are some of the obstacles in developing food security, especially in transmigration areas. If these obstacles are not resolved, it will disrupt the growing season, while crop failure may become a more frequent phenomenon.

Many researchers have studied the challenges of food security in Indonesia (Hadiprayitno, 2020; Neilson & Wright, 2017; Piesse, 2016; Rozaki, 2020; Timmer, 2004; Vel, McCarthy, & Zen, 2016). Meanwhile, few studies have investigated challenges in the implementation of transmigration development to support food security. This research focused on that gap by aiming to answer the following research question: To what extend the role of transmigration supports national food security? Furthermore, this study will give some recommendations for the government on developing transmigration and food security policies.

The following section explores the food security and transmigration concept and policies in Indonesia. Secondly, the methods to conduct this research are described in section three. Then, the concept is critically discussed to identify some challenges. Finally, the findings are concluded in the last section.

2. Concept and Policies of Food Security and Transmigration Development in Indonesia

2.1 Concept and Policies of Food Security in Indonesia

2.1.1 Definition of Food Security

The definition of Food security in Indonesia is stated in Law No.18 of 2012 concerning food, which explains that Food Security is "the fulfillment condition of food from the state to individuals, which is reflected in the availability of sufficient food, both quantity, and quality, safe, diverse, nutritious, equitable, and affordable food and does not conflict with the religion, belief, and culture of the community, in order for them to live a healthy, active and productive life in a sustainable manner" (Republic of Indonesia, 2012). The concept of food security that can be underlined in this Food Law covers three main dimensions, food availability, affordability, and food utilization. In more detail, BULOG (BULOG, 2014) emphasized that the Food Law not only talks about food security but also clarifies the importance of food security that needs to be supported by food sovereignty, food resilience, and food safety.

The concept of food security can be translated very broadly, varies, and evolves from time to time. Kulsum (2020) explains that there are at least three main changes in the crucial issue of world food security. Initially, it tried to solve the issue of how the world can produce sufficient food. Then, it turned into the issue of whether the world can produce enough food at an affordable price for the poor. Now the issue has grown to whether the world can produce not only sufficient food at a secure price and affordable for the poor, but also environmentally friendly.

2.1.2 Food Security Measurement

Various concepts and definitions of food security have implications for measuring food security. Food security can be measured at various levels starting from the global, national, to regional (provincial, district, and city) levels. At the global level, there is a Global Food Security Index (GFSI) developed by The Economist Intelligence Unit (The Economist Intelligence Unit, 2019). This index has three main components in its measurement, affordability, availability, and quality and safety (Economist Intelligence Unit, 2019). In Indonesia, food security measurement uses the Food Security Index (*Indeks Ketahanan Pangan* - IKP) developed by the Food Security Agency (*Badan Ketahanan Pangan* - BKP), an institution under the Ministry of Agriculture. The formulation of the IKP is based on three main dimensions of food security as stated in Law No. 18 of 2012, availability, affordability, and utilization (Badan Ketahanan Pangan, 2019). The main objective of the IKP is to evaluate the achievement of food security and nutrition in districts, cities, and provinces and to provide a ranking overview of food security levels in districts, cities, and provinces compared to other districts, cities, and provinces. IKP is expected to be used as a basis for determining targeted government programs or other interventions (Badan Ketahanan Pangan, 2019).

Based on data released by BKP in 2019, there are five provinces with the best IKP score, Bali (85.15), DI Yogyakarta (83.63), North Sulawesi (81.44), Central Java (78.85), and South Sulawesi (78.69). Meanwhile, the five provinces with the lowest IKP score were Papua (25.13), West Papua (30.12), East Nusa Tenggara (50.69), Maluku (52.35), and West Kalimantan (55.17). It can be seen that the problem of food security is still a crucial issue, especially in the Eastern part of Indonesia.

2.1.3 Food Security in Indonesia

Globally, based on the Global Food Security Index (GFSI), in 2019, Indonesia was ranked 62 out of 113 countries, with an index value of 62.8. The position and value of Indonesia's index have increased from 2012, which was originally ranked 64th with a score of 46.8. At the regional level, Indonesia is ranked 12th, lagging behind other Southeast Asian countries such as Vietnam (11th place, 64.6), Thailand (9th place, 65.1), Malaysia (5th place, 73.8), and Singapore (1st place, 87.4) (Economist Intelligence Unit, 2019).

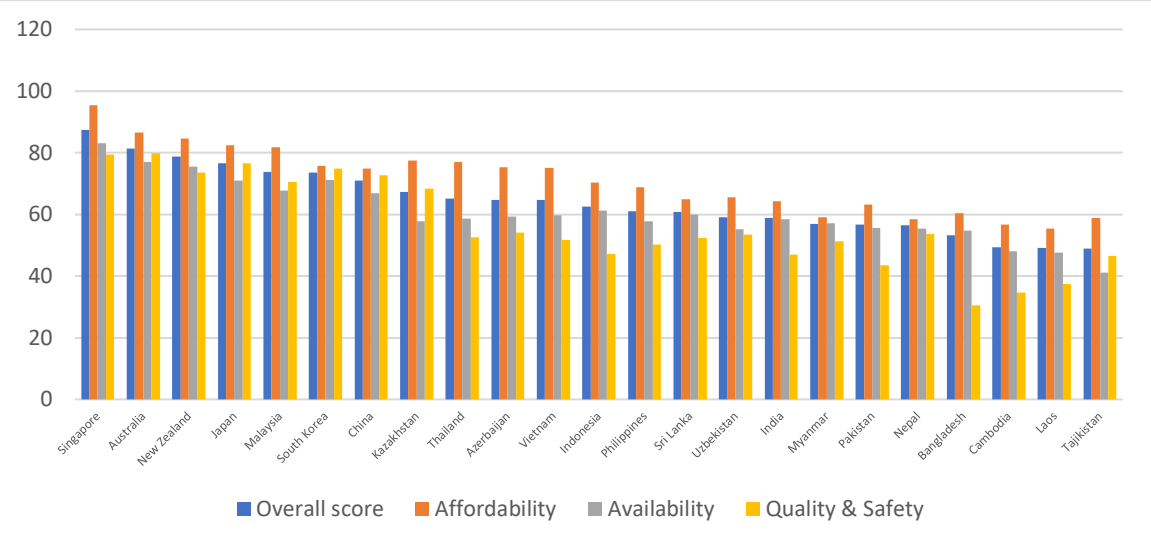


Figure 5. Performance of Countries based on Their 2019 Food Security Score (Asia Pacific)
Source: The Economist Intelligence Unit (EIU), 2019

In the 2020-2024 RPJMN, during the 2015-2019 period, several improvements have been achieved in production, a rice surplus of around 2.8 million tons in 2018 and an average growth of meat production of 5.5 percent per year (Republic of Indonesia, 2020). More comprehensively, in measuring Indonesia's food security, there is a study conducted by Hermanto (2015) using 4 (four) dimensions used by FAO. He classified food security in Indonesia into three states, sufficient in terms of food availability, medium/moderate in terms of food accessibility, low food utilization, and relatively unstable food prices. Using AFSIS data (2014), Hermanto (2015) measures the dependency ratio of Indonesia's rice imports to determine food availability and affordability. He found that the ratio is relatively lower, at 5.22%, compared to the dependency ratio on average rice imports in the ASEAN region (30.48%), suggesting that national rice availability is relatively good in the ASEAN region.

Based on Central Bureau of Statistics Republic of Indonesia data (Badan Pusat Statistik, 2015), in general, the production of horticultural food crops, especially rice, corn, soybeans, cassava, and sweet potatoes in the last 15 years (2000-2015) has continued to increase. In 2015, the highest record was achieved for rice production, at 75.39 million tons increasing from the previous year, 70.84 million tons. The increase in average rice production per year amounted to 1.67 million tons. The next biggest production is the production of cassava (21.8 million tons) and corn (19.6 million tons) in 2015. The production of soybean is still very minimal compared to other food crops. The total production in 2015 was 963 thousand tons (Badan Pusat Statistik, 2015).

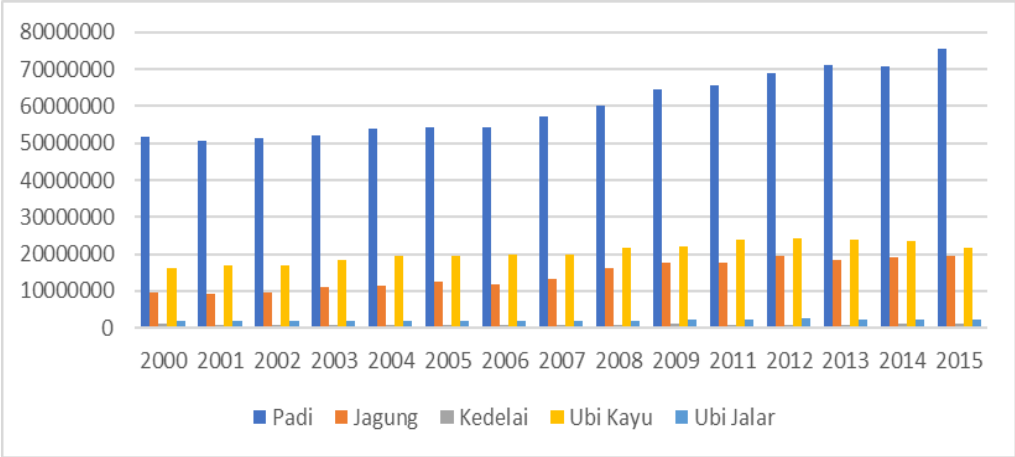


Figure 6. Production of Horticultural Food Crops (Rice, Corn, Soybeans, Cassava, Sweet Potatoes) in Indonesia (2000-2015) (ton)
Source: BPS, 2015

Due to its large population and food consumption, Indonesia is categorized as one of the largest foods producing countries in ASEAN but also the major importer. Based on BPS data (Badan Pusat Statistik, 2019a) which is illustrated in Figure 8, it can be seen that Indonesia's rice imports have fluctuated from year to year. In 2019, the total rice imports were 444.5 thousand tons, decreasing from the previous year at 2.25 million tons. The highest rice import in Indonesia was recorded in 2011, amounting to 2.75 million tons, while its lowest figure was in 2004 at 236.6 thousand tons. The biggest rice importers from Indonesia are Vietnam and Thailand, followed by India and Pakistan. The imports of soybean continue to increase every year. In 2019, Indonesia's total soybean imports reached 2.67 million tons, increasing 84 thousand tons from the previous year at 2.58 million tons (Badan Pusat Statistik, 2019b). The largest importers of soybeans from Indonesia are the United States and Canada, while the import value from other countries is not very significant.

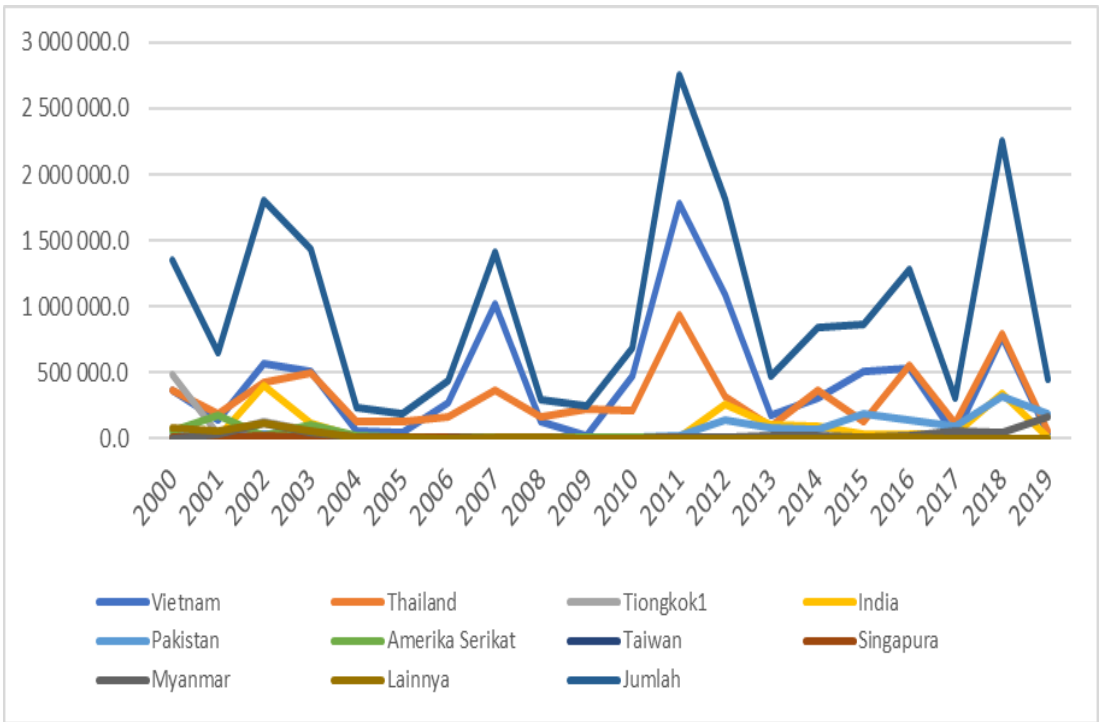


Figure 7. Indonesia's Rice Imports by Main Country of Origin (2000-2019) (ton)
Source: BPS, 2019a

The next dimension of food security is food utility. Dietary diversity is used as the indicator because food quality is considered good if their food consumption is diverse. Based on data compiled by the Economist Intelligence Unit (2019), at 31%, the value of Indonesia's dietary diversity is far behind other Southeast Asian countries such as Malaysia (56%), Thailand (51%), and Vietnam (42%). To put it in prespective, the global average value is 52.3%. This indicates that Indonesia is a country with a low diversity index in consumption.

The last dimension is the dimension of food price stability. This dimension appears along with the frequent occurrence of food crises at various global and domestic levels. In Indonesia, the stability of food prices, especially rice, tends to remain uncertain. Patunru & Ilman (2020) reported that rice price has consistently increased from 1998 to 2017 at the rate of 0.9% per year, despite a production surge of 2.5 % per year. Furthermore, Patunru & Ilman (2020) underlines that the rice prices in Indonesia defy the law of supply-demand, where an increase in the amount of production should lower prices. His analysis concluded that price changes often did not match the actual rice stock claims made by the Ministry of Agriculture.

However, it is essential to highlight that although food availability or food production in Indonesia has consistently increased, the overall value of Indonesian food security is still low (ranked 62 out of 113) and is lagging behind other Southeast Asian countries. As an agricultural and maritime country with abundant potential food sources, Indonesia should achieve food security and food sovereignty. It is very risky for national stability if Indonesia is too dependent on food supplies from other countries or international markets, given its large population (Hermanto, 2015). Therefore, the government needs to seriously focus on the realization of food security supported by government policies.

2.1.4 Comparison of Food Policies in Southeast Asia

To protect farmers, producers, and consumers, some countries in Southeast Asia have implemented various policies and programs by determining basic price policies, providing stock and consumer price stabilization, and maintaining food distribution. The government mandates various institutions to carry out these interventions through a state-owned enterprise such as Public Warehouse Organization (PWO) in Thailand and National Food Authority (NFA) in the Philippines, or an open company, BERNAS in Malaysia. The table below shows a detailed comparison of various food policies, including National Grand Strategies, Institutions, Support Programs, especially among the largest food producers in Southeast Asia such as Indonesia, Vietnam, Thailand, the Philippines, and Malaysia.

Tabel 1. Comparison of Strategies, Institutions, and Programs on Food Management in Southeast Asia

Policies	Indonesia	Vietnam	Thailand	Filipina	Malaysia
National Grand Strategies	Rice Self-Sufficiency (*Swasembada Beras*) and Agricultural Revitalization	• Rice Market Development Strategy of 2017-2020 (guidance to reduce the volume of rice export while increasing the rice import value) • Restructuring Agriculture in order to increase added-value and promote sustainable development program	Thailand's agricultural development vision is "farmers get a higher standard of living, the community has food security, and the state gets revenue."	Food Staples Sufficiency Program (FSSP): 1) maintain R&D of crop varieties, 2) encourage higher production, and 3) manage the consumption of staple foods	National Agro Policy program (2011-2020): Malaysia's self-sufficiency in food, increasing product value, re-stimulating supply chain
Institutions	BULOG Regulate import quotas and import timing	Vietnam Food Association (VFA) monitor rice export and import and other food commodities	Public Warehouse Organization (PWO) managed by Thailand's Ministry of Trade	National Food Authority (NFA): regulate import quotas both for government and private	BERNAS: monitoring and transforming local rice, imported rice, warehouse, distribution, marketing, setting the base price, rice manufacturing,

Policies	Indonesia	Vietnam	Thailand	Filipina	Malaysia
					import monopoly, and farmers subsidies management
National Program	• Ketapang Food Estate dan Merauke Integrated Food and Energy Estate (MIFEE). A program that integrated agriculture, farm, dairy product, and fisheries by creating new areas • MOA No.4/2016. The government provides high-quality fertilizers and seeds • MOA No. 47/2017. The government provides seeds for farmers in the selected area to increase production • RPJMN 2020-2024: Farmer Corporation and Food Estate in Central Kalimantan	• System Rice intensification (SRI), Encourage farmers to plant at specific intervals according to water management and promote organic fertilizer • Converting production to high-value crops • Decree No.35/2015. The government compensates 50%-70% of crop losses due to disaster, 70% cost of agricultural land opening, and 100% rice seeds cost	• Provide the latest agricultural technology information and promote Good Agricultural Practices (GAP) • *Rice Farmer Assistance Measure Program*: 1) support farmers affected by drought, 2) provide debt deferral for two years at the same interest, 3) partial compensation for crop losses, 4) subsidize the partial cost of harvest and post-harvest, 5) loan credit to promote green and sustainable agriculture	• Rice competitiveness Enhancement Funds aims to improve farmer welfare by reducing the cost of productions • Rice harvest mechanization • Special Area for Agriculture Development (SAAD) aims to increase agricultural productivity based on local potential by providing technical assistance to farmers in collaboration with the private sector • Seed subsidy program • Republic Act No 11203. New tariff policy for rice and replaces quantitative restrictions for imports	• SUBUR program: Coupon for the poor for certain types of rice • Subsidize production costs for reliable chemicals and fertilizers • Improvement of irrigation, seedlings, agricultural technology, and paddy fields integrations • Zoning system for rice storage • Import tariffs for food

Sources: (Bappenas, 2020; BULOG, 2014; Dabukke & Iqbal, 2014; Patunru & Ilman, 2020)

In general, there are similarities in policies among food-producing countries in Southeast Asia. It can be seen in the table that various policies are prioritized in efforts to protect farmers and price stability through various import policies. Some of the policies are starting to focus on more sustainable agricultural policies, such as those in Thailand (green agricultural loan credit and GAP) and Vietnam (water management and organic fertilizers). However, according to Patunru & Ilman (2020), there is a common pattern of policies in other rice importing countries absent from the food security projects in Indonesia. It seems that other ASEAN countries have already begun to focus on improving product quality through good land management with full support to farmers through various subsidies as an effort to reduce production costs.

2.1.5 National Food Security Policies in Indonesia

Policies and programs to strengthen food security in Indonesia have been going on since the era of President Soekarno. In the Soekarno era (1946-1965), the most prominent food policies were the Kasimo Welfare Program (*Program Kesejahteraan Kasimo*) and the Paddy Central Program (*Program Sentra Padi*), which focused on self-sufficiency in food production by controlling food distribution. During the Soeharto or New Order era (1966-1998), various food security policies focused on rice self-sufficiency *(Swasembada Beras*). Several programs to implement the Green Revolution were promoted starting in the 1960s, through the Mass Guidance (*Bimbingan Masal* - BIMAS) program in 1968-1977, Special

Intensification (*Intensifikasi Khusus* - INSUS) in 1979, and Supra INSUS in 1987. Through these various programs, the increase in rice production reached an average of 4.34% per year, which led Indonesia to achieve rice self-sufficiency in 1984. However, rice self-sufficiency did not last long; wherein 1990, Indonesia again experienced a rice deficit of 48 thousand tons (Permatasari & Wijaya, 2018).

During the Reformation era, the reign of President BJ Habibie, Abdurahman Wahid, and Megawati Sukarnoputri, the policy of self-sufficiency in rice was continued. President Abdurahman Wahid reiterated the role of BULOG in terms of rice logistics management, including supply, distribution, and price control. In the era of President Megawati, Bulog was privatized (2003), and in 2004, rice self-sufficiency was emphasized as a single strategy in the food sector (Kulsum, 2020). President Susilo Bambang Yudhoyono introduced the policy of agricultural revitalization, rehabilitation of agricultural infrastructure, and self-sufficiency in five food commodities such as rice, corn, sugar, soybeans, and beef (Permatasari & Wijaya, 2018). This policy is supported by various programs, including improving farmers' access to business funding through People's Business Credit (*Kredit Usaha Rakyat* - KUR).

During the Joko Widodo administration, various programs were launched to support food self-sufficiency. Some of these programs include Paddy Production Program (*Program Cetak Sawah*), Community Food Granary Program (*Program Lumbung Pangan Masyarakat*), and Agriculture Business Corporation (*Korporasi Usaha Tani*). In the 2020-2024 RPJMN, the food security policy is part of the seven development agendas, strengthening economic resilience for quality and equitable growth. The food security policy is interpreted into Priority Program 3, Increasing the availability, access, and quality of food consumption (Republic of Indonesia, 2020).

In addition, at the Presidential Limited Meeting (*Rapat Terbatas*) of the Acceleration of Strengthening the Agriculture and Fisheries Sector (December 10, 2019), the National Government also developed a farmer corporation and revitalized the food system. It emphasized Farmer Welfare (*Nilai Tukar Petani* - NTP) through various interventions on 1) food assistance to keep farmers access to food, 2) strengthening farmer corporation to ensure that farmers continue to run profitable farming, and 3) stability of access to food. Through these interventions, it is expected that the productivity of commodities will increase by 5%, elevate the added value per agricultural workforce of Rp. 54.2 million / labor, improve fishermen income to Rp. 55.4 million / fisherman and 65 clusters were formed (Directorate of Food and Agriculture, 2020). This policy of strengthening food security is also supported by infrastructure development. One of the important projects is constructing 18 multipurpose reservoirs, one of the Major Projects (MP) in the 2020-2024 RPJMN. This reservoir provides water supply in 51 premium irrigation areas by 20% to support food security. The multipurpose reservoir has not been utilized optimally, worsened by the low performance of the irrigation system operation and maintenance. For example, the supply of irrigation water from dams until 2019 has only reached 12.3 percent of the total irrigation area (Bappenas, 2020).

Based on the literature review starting from definitions, measurements, and implementations, including regional and national policy comparisons, it can be concluded that Indonesia still has a big task in fulfilling food security. According to Hermanto, (2015), to increase national food security and national food self-sufficiency, Indonesia should focus on policies to increase the production and productivity of strategic food commodities through optimal utilization of national resources and achieving national food stock sufficiency. Even though imports are unavoidable, Indonesia needs to regulate imports strictly. Import should be considered when domestic production is insufficient to stabilize food prices and supplies.

2.2 Concept and Policies of Transmigration Development in Indonesia

2.2.1 Evolution of Transmigration Development in Indonesia

Since 1905, transmigration development has been carried out as an effort to reduce poverty and population density in Java, as well as to develop food production areas outside Java. The transmigration location has become the embryo for the development of 1,136 definitive villages, 339 sub-district capitals, 104 district capitals, two provincial capitals, and one location for the candidate for the state capital (Kementerian Desa, Pembangunan Daerah Tertinggal, 2019)

However, the implementation of transmigration faced various problems. Many transmigration locations proposed by the regional government are remote areas and far from their closest growth centers. Housing and settlement facilities, infrastructure, and the economy in the transmigration area are still limited. This condition limits the economic activity in the transmigration and its surrounding areas.

Besides, there are still several land ownership problems at the transmigration location, so that the fulfillment of land certificates for transmigrants has not been optimal (Wiroyudo, 2019).

A paradigm shift in carrying out migration programs is required to overcome the problems of transmigration development. Based on Law No. 29 of 2009 concerning Amendments to Law No. 15 of 1997 concerning transmigration, the development of transmigration is not only focused on population movement, but also on the development of new centers as a catalysator for the regional economic development (Republic of Indonesia, 2009). With a change of the paradigm, it emphasizes the role of transmigration development as a driver for regional development, especially outside Java.

In the 2020-2024 RPJMN, the transmigration development policy is part of the effort to achieve the Second National Priority development target, "Regional Development to Reduce Gaps and Ensure Equity." The focus of transmigration development in 2020-2024 is the revitalization of transmigration areas so that they are able to develop local and regional growth centers. This transmigration area revitalization activity is one of the National Priority Projects in the Development Priority Activities of Disadvantaged Areas, Border Areas, Rural Areas, and Transmigration in Second National Priority RPJMN 2020-2024. The average development index values of the 52 revitalized transmigration areas are 48.74 for 2020 and 57.50 for 2024. These values are seen as an indicator of the revitalization of transmigration. To achieve the target, transmigration development focuses on revitalizing 52 priority transmigration areas, as illustrated in the map below.

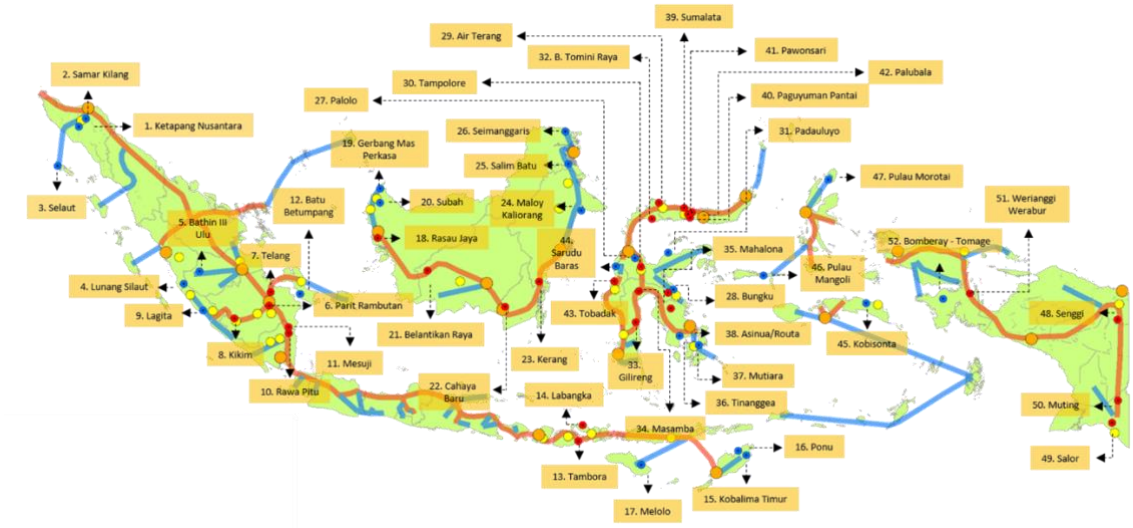


Figure 8. Map of Selected Transmigration Area as Targeted Area of RPJMN 2020-2024
Source: Directorate of Disadvantaged Regions, Transmigrations, and Rural Development, Bappenas, 2020

Coordination between stakeholders is needed across sectors and actors to accelerate community welfare improvement in the transmigration area. The implementation of transmigration is not only the responsibility of the central government. The provincial and district or municipal governments need to accelerate transmigration development as part of the development of their respective regions. Other stakeholders, such as businesses, academia, and the community, should also participate in this transmigration program.

According to Presidential Regulation No. 50 of 2018 concerning Coordination and Integration of the Implementation of Transmigration, coordination, and integration of transmigration operations are carried out in (1) transmigration area planning, (2) transmigration area development, and (3) transmigration community development and transmigration areas. This coordination was carried out by establishing a coordinating team and integrating transmigration administration, consisting of a national, a provincial, and a district or municipal team. The coordination and integration team implementing transmigration at the national level is determined by the transmigration administration minister, while the governor determines the team at the provincial level, and the team at the district or municipal level is determined by the regent or mayor (Republic of Indonesia, 2018).

2.2.2 The Transmigration Supports for A Food Estate Project

In addition to supporting the achievement of Second National Priority targets in the RPJMN 2020-2024, transmigration development also supports the achievement of First National Priority, "Strengthening Economic Resilience for Quality and Fair Growth" in RKP 2021, especially in Major Project of Food Estate (Republic of Indonesia, 2020). This is in line with the presidential decree on June 24, 2020, which states that transmigrants who have expertise in the modern mechanization of rice farming and rice estate should be employed to meet labor shortages in food estate development locations such as in Central Kalimantan Province. If additional farmers are needed, it will be carried out through the Strategic Logistics Reserve (CLS) scheme by the Ministry of Defense.

The Food Estate Development in Central Kalimantan is implemented on ex-peatlands which are administratively located in two districts, Kapuas Regency and Pulang Pisau Regency. The ex-peatlands in the two districts intersect with the Lamunti-Dadahup transmigration area in Kapuas Regency and the former transmigration settlement in Pulang Pisau Regency.

Lamunti-Dadahup Transmigration Area is a transmigration area of 1,707.59 square kilometers in Kapuas Regency, covering six districts and 59 villages with a population of more than 58 thousand people. Most of the people in that area are rice farmers with per capita income for 2018 about 40 million rupiah (Kementerian Desa, Pembangunan Daerah Tertinggal, 2019). The income is still below Indonesia Kapuas Regency per capita income in 2018 which was about 42.59 million rupiah (Badan Pusat Statistik, 2020). Therefore, an innovative approach through food estate development is needed in order to increase people's welfare in transmigration areas.

In this regard, the Ministry of Village, Disadvantaged Area, and Transmigration Development as the supervisor of transmigration activities has allocated a budget in 2021 to support the development of food estates in Central Kalimantan Province, especially in Kapuas and Pulang Pisau Regency. Several types of support for these activities include (1) extensification development in the Lamunti-Dadahup Transmigration Area, Kapuas Regency, (2) intensification development in the Lamunti-Dadahup Transmigration Area, Kapuas Regency with the ara of 150.77 square kilometers, and (3) preparation for the development of the transmigration area in Pulang Pisau Regency (Republic of Indonesia, 2020).

2.3 The Transmigration Concept for Food Security

According to Law No. 18 of 2012 regarding food, the government obliges to (1) control, develop and allocate land for agriculture and water security, (2) provide facilitation and mentoring to the communities, (3) abolish any policies that lead to reduce competitiveness, (4) provide the budget for agriculture development, (5) develop and socialize the agriculture technology and knowledge to improve food production, (6) facilitate and develop tools of production and other supporting infrastructure for improving food production, and (7) develop food institutions to improve food production. In short, the government must involve from the upstream to the downstream of food security (Republic of Indonesia, 2012).

Transmigration is an appropriate intervention since the transmigration program is a cross-sectoral activity that is in line with the Food Law mandatories. The transmigration program was initially designed to reduce the population density in Java and Bali and develop new areas outside Java and Bali (Junaidi, Rustiadi, Sutomo, & Juanda, 2012). It was like the pioneering program in the United States centuries ago. Since most of the transmigration activities are in agriculture, the program is closely related to food production. The transmigration program is one of the alternatives to accelerate the achievement of food security goals. Principally, the concept of the transmigration program is to utilize the uninhabited land outside Java and Bali island, where the population is less dense. By utilizing the uninhabited lands for farming and other agriculture activities, the production of food products can be boosted to fulfill the national food stock.

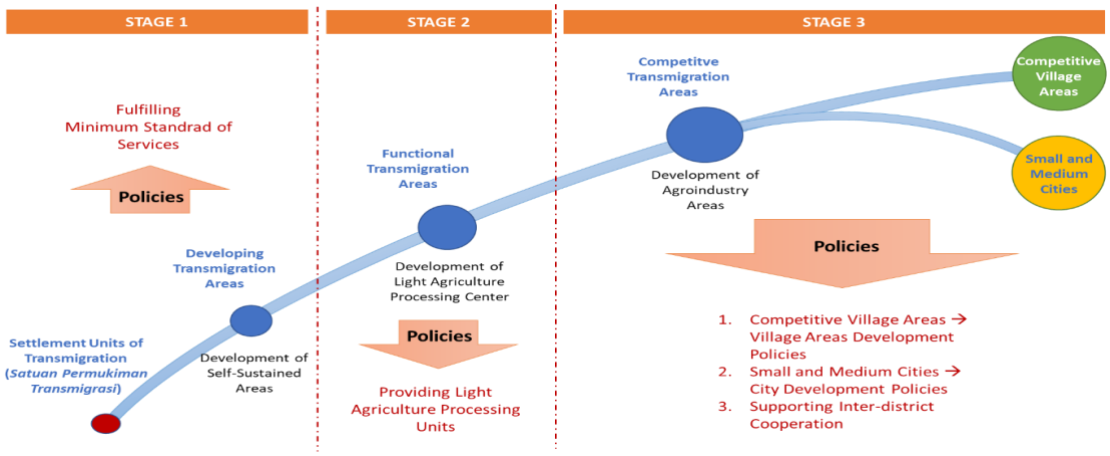


Figure 9. Concept of Transmigration to Support Regional Development and Food Security
Source: Bappenas, 2020

Figure 9 displays how the transmigration program can support regional development in a new area and improve national food stock or food security. The program can take three stages: the development stages of transmigration areas - developing transmigration areas, functional transmigration areas, and competitive transmigration areas (Bappenas, 2020). The first stage is developing transmigration areas as self-sustained areas. In the first stage, the government provides and fulfills the basic services such as civil services, health, education, live supports, basic settlement, and land to produce output that can support transmigrant lives. Once the areas become self-sustained zones, the policies are to support areas transforming into light agriculture processing centers in functional transmigration areas. In the second stage, once the areas achieving light agriculture processing centers, the areas are encouraged to sell their products to other areas. When the demand for their products grows moderately, the areas are stimulated to become the center of agroindustry or as competitive transmigration areas.

Furthermore, the competitive transmigration areas can transform into competitive village areas or small and medium cities that have roles as agribusiness centers. There are two policy options to achieve these objectives. First, if the transmigration areas remain in rural conditions, the policy is to support the village's competitiveness to compete in the global or national market. Second, if the transmigration areas grow and transform into small and medium agroindustry cities, the policies for the small and medium cities will be introduced to this area (Bappenas, 2020).

Either objective requires pre-conditions to guarantee that the program runs well and yield expected results (Bappenas, 2020). These pre-conditions are (1) fulfillment of minimum standard of basic services, (2) clear land legal status, (3) good and accessible connectivity infrastructures and mode of transportation, and (4) interregional cooperation.

2.3.1 Fulfillment of Minimum Standard of Basic Services

Before transmigration areas develop into the agroindustry center, the government must provide basic services according to the national standard. All basic infrastructure such as health services, education, community building, electricity, and other civic services must be available and easily accessible to the transmigrants in the transmigration and surrounding area. This pre-condition aims to secure the transmigrants' rights and encourage them to live and work comfortably as if they are in their hometown.

2.3.2 Clear Land Legal Status

Most of the land for transmigration originated from the forest under the Ministry of Environment and Forestry (*Kementerian Kehutanan dan Lingkungan Hidup* - KLHK) jurisdiction. In order to transform the land utilization from forestry to agriculture, the KLHK has to agree to convert the legal status of the designated forest into agriculture. Once the permission is granted, the Ministry of Village, Disadvantage Regions and Transmigration (*Kementerian Desa, Pembangunan Daerah Tertinggal, dan Transmigrasi*) will work with the land agency (*Badan Pertanahan Nasional* - BPN) for land certification. In the past, there were many land disputes between transmigrant and local people and between transmigrants and nearby plantation or mining companies due to unclear land status and boundary of transmigration area. The

undisputed land status will secure transmigrant's property right in the future. It also can be used as collateral when they apply for credit in the future.

2.3.3 Good and Accessible Connectivity Infrastructures and Mode of Transportation

According to the existing transmigration regulations, transmigration areas proposed by the local government are mostly located in remote areas. It needs extensive efforts to reach the transmigration area using the local transportation. Better access to infrastructures and modes of transportation will enable transmigrants to transport their agriculture products to the nearest market. It also reduces transportation and logistics costs such as warehousing and intermediary agencies.

2.3.4 Interregional Cooperation

The transmigration program covers more than one region. It takes at least two regions, origin region, and designated region. It also covers the surrounding regions of the designated region. In short, it covers many regions with similar interests. The cooperation among regions involved in the transmigration program will ensure the quality of transmigrant, the market, and the distribution of agriculture products.

3. Methodology

The research question focuses on how the transmigration program can contribute significantly to national food security. The study is carried out through a descriptive qualitative analysis method explained by Rahmawati (2020), a method that analyses data from a review of diverse literature and discussions. The paper compares the rice and maize production of the transmigration area with those in associated provinces. Other factors affecting food production in the transmigration area are taken into account as well. We expect that the transmigration program has contributed meaningfully to the food production in respective provinces.

Data adjustment has been made to get a more consistent and plausible analysis. Data used in this analysis is from the Ministry of Village, Disadvantaged Region, and Transmigration Development and Central Statistics Agency (BPS). Some provinces have been excluded from the analysis due to inconsistent figures between the provincial and transmigration areas. However, the findings and recommendations are generally applied to the transmigration program.

4. Analysis

4.1 Contribution of Transmigration Development in Food Production

According to the RPJMN 2020-2024 and RKP 2021, the transmigration program has 53 transmigration targeted areas. About 52 transmigration areas are the RPJMN's targets, and one transmigration area is targeting the presidential decree in developing food estate. Because they are located outside Java and Bali, the analysis will not cover Java and Bali. The 53-transmigration areas are spread out in 23 provinces. It covers around 746 settlement units and around 2.5 million inhabitants in the transmigration area. The following table shows the distribution of 52 transmigration areas and the number of populations in the area.

Table 2. Distribution Transmigration Area

No	Province	Number of Transmigration Area	Number of Transmigration Settlement Unit	Number of People in the Transmigration Area	Number of Household in Transmigration Area
1	Aceh	3	11	42,758	53,529
2	Bangka Belitung	1	14	33,293	8,323
3	Bengkulu	1	20	104,228	42,642
4	Gorontalo	4	62	217,059	69,005
5	Jambi	1	13	19,200	33,897

No	Province	Number of Transmigration Area	Number of Transmigration Settlement Unit	Number of People in the Transmigration Area	Number of Household in Transmigration Area
6	Kalimantan Barat	3	48	233,088	76,606
7	Kalimantan Selatan	1	32	72,316	18,079
8	Kalimantan Tengah	2	58	69,553	17,388
9	Kalimantan Timur	2	33	72,269	23,438
10	Kalimantan Utara	3	16	289,155	72,289
11	Lampung	2	17	72,302	34,138
12	Maluku	1	19	21,785	5,446
13	Maluku Utara	2	44	148,173	41,595
14	NTB	2	10	57,285	14,321
15	NTT	3	53	163,400	74,259
16	Papua	3	56	58,498	14,625
17	Papua Barat	2	4	2,357	9,933
18	Sulawesi Barat	2	35	128,305	70,468
19	Sulawesi Selatan	3	25	81,634	90,674
20	Sulawesi Tengah	6	100	343,499	97,925
21	Sulawesi Tenggara	2	33	74,069	30,823
22	Sumatera Barat	1	12	41,254	10,314
23	Sumatera Selatan	3	31	178,647	134,950
	Total	**53**	**746**	**2,524,127**	**1,044,665**

Source: Kementerian Desa, Pembangunan Daerah Tertinggal, dan Transmigrasi, 2019b

The following table shows how the transmigration program can contribute to national food security.

Table 3. Contribution of Transmigration Area in term of Ricefield - Rice Production and Maize field -Maize Production to the Ricefield - Rice Production and Maize field -Maize Production in Respective Provinces in 2018 (%)

No	Province	Ricefield	Rice Production	Maize field	Maize Production
1	Aceh	10	7.3	42,758	53,529
2	Bangka Belitung	564	1,168.0	33,293	8,323
3	Bengkulu	45	39.6	104,228	42,642
4	Gorontalo	33	29.3	217,059	69,005
5	Jambi	2	0.4	19,200	33,897
6	Kalimantan Barat	19	16.3	233,088	76,606
7	Kalimantan Selatan	6	4.1	72,316	18,079
8	Kalimantan Tengah	-	-	69,553	17,388

No	Province	Ricefield	Rice Production	Maize field	Maize Production
9	Kalimantan Timur	102	101.5	72,269	23,438
10	Kalimantan Utara	12	1.9	289,155	72,289
11	Lampung	7	6.0	72,302	34,138
12	Maluku	84	79.7	21,785	5,446
13	Maluku Utara	-	-	148,173	41,595
14	NTB	4	3.1	57,285	14,321
15	NTT	8	9.0	163,400	74,259
16	Papua	78	74.6	58,498	14,625
17	Papua Barat	-	-	2,357	9,933
18	Sulawesi Barat	19	17.1	128,305	70,468
19	Sulawesi Selatan	0	0.3	81,634	90,674
20	Sulawesi Tengah	26	22.3	343,499	97,925
21	Sulawesi Tenggara	9	4.5	74,069	30,823
22	Sumatera Barat	7	5.3	41,254	10,314
23	Sumatera Selatan	15	12.3	178,647	134,950
	Total Ratio (Exclude Java and Bali)	**10.9**	**8.7**	**9.1**	**9.0**
	National	**6.1**	**4.4**	**5.6**	**5.3**

Source: Processed from (Kementerian Desa, Pembangunan Daerah Tertinggal, 2019)

*Note: * There are some inconsistent data in Bangka – Belitung, Kalimantan Timur, Papua and Papua Barat Provinces.*

On average, rice and corn production in the transmigration area contributes around 4% and 5%, respectively, to the national production. The figure at the national level covers Java and Bali, which are the main sources of food production in Indonesia. If Java and Bali are excluded from the national figures, the contribution of the transmigration program in food production (rice and maize) doubled to around 8% and 9%, respectively. A similar figure is also depicted in the size of rice and maize field. Both contribute around 10% and 9% respectively in this year. When looking at the provincial level, many transmigration areas contributed more than 10% to rice and maize production and reached significant figures in Maluku, Maluku Utara, NTT, and Sulawesi Tengah.

On the other hand, the budget allocation for the transmigration program in the Ministry of Village, Disadvantaged Region, and Transmigration Development tells a different story about the program's priority. In the 2018-2020 period, the budget allocation experience a declining trend. The following figure depicts this condition.

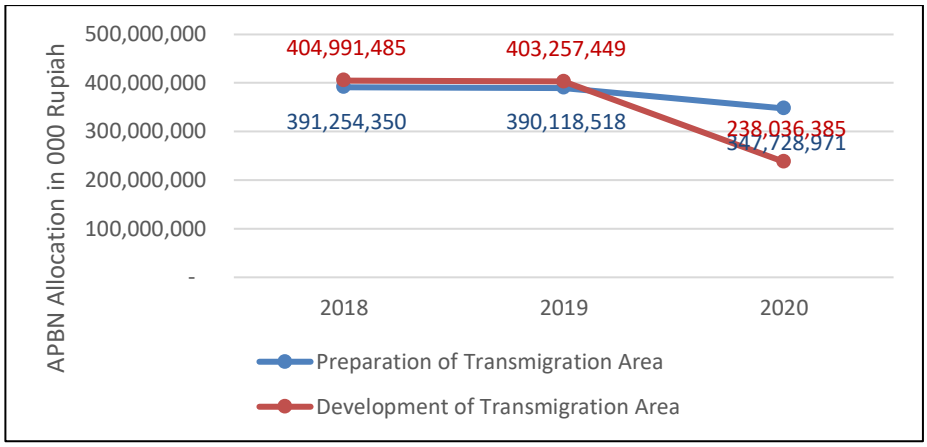


Figure 10. National Budget Allocation for Transmigration Development in 2018-2020 (in 000 Rupiahs)
Source: Bappenas, 2020

The total allocation declines from around Rp 800 billion in 2018 to around Rp 585 billion in 2020, a drop of around 27%. Budget reallocation during the covid 19 pandemics seems to be the reason for the budget cut. Most ministries reallocated their budget to handle the covid 19. However, if we look at 2018 and 2019 allocation, the trend did not change significantly and remain relatively stagnant. This is the challenge for transmigration stakeholders in the future in fulfilling the expected outcomes with limited resources. Based on the figures above, it can be concluded that the transmigration program did have some potential to be the engine of national food production. However, related stakeholders should all participate in tackling the attendant challenges. The following section explains the challenges of the transmigration program that should be taken into account.

4.2 Challenges in Implementing Transmigration Development to Support National Food Security

Based on these pre-conditions, some challenges should be addressed before implementing the transmigration program. In general, there are five challenges, (1) stakeholder cooperation, (2) transmigration area management, (3) utilization of suitable agriculture technology, (4) transmigration area masterplan, and (5) quality of human resources. These are depicted in the following figure.

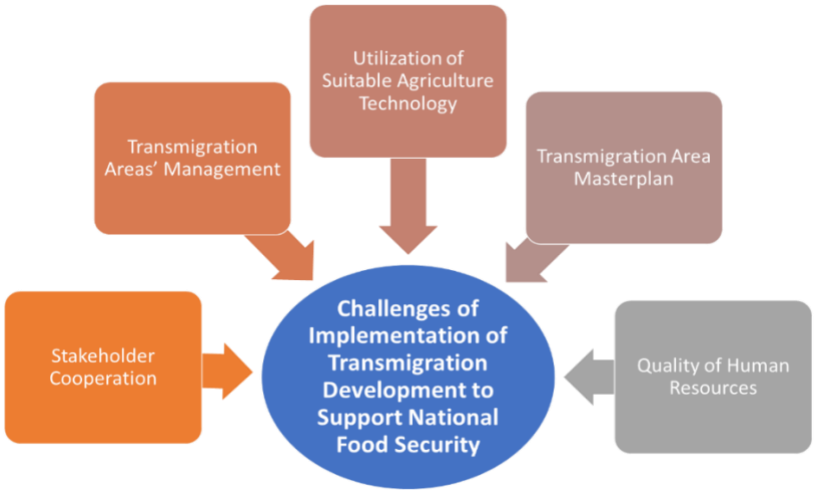


Figure 11. Main Challenges of Implementation of Transmigration Development to Support National Food Security

4.2.1. Stakeholder Cooperation

Transmigration is a program that involves many stakeholders. To achieve optimal results, cooperation among stakeholders is inevitable. Figure 12 shows the activities of the transmigration program and its relation to the food production process. It is clear that the transmigration program covers many aspects and leads to close coordination among stakeholders to produce optimum results. Most of the transmigration area output is food products such as rice, nuts, vegetables, fruit, cattle, and fish. Therefore, it is not only the responsibility of the Ministry of Agriculture and Ministry of Village, Disadvantaged Regions, and Transmigration. To build and improve irrigation networks, road networks, these ministries must coordinate with the Ministry of Public Works; to deal with warehousing and market, they have to deal with the Ministry of Trade; and for food processing, the Ministry of Industry and Food and Drug Agency should take the lead. Moreover, for facilitating business development, the Ministry of SMEs will take part while the Ministry of Telecommunication and Information will play a significant role in utilizing ICT.

So far, the transmigration program has not been executed optimally due to limited awareness of cooperation among stakeholders. Each technical ministry felt that the transmigration program was not under its authority. On the other hand, the regional government relied heavily on the central government. Thus, the Ministry of Village, Disadvantaged Regions, and Transmigration continue to finance the transmigration program. Business operators view transmigrants only as laborers to work in their plantations.

Collaboration between stakeholders includes an agreement regarding task division and its authorities, funding sharing, and the construction of facilities and infrastructure to support the transmigration area. This collaboration should also encompass rules, standards, and procedures for the management of transmigration areas and other regulations needed to support the smooth implementation of the program. Each agency and ministry need to put aside their egos. Implementing the transmigration program is a formidable challenge because not all agencies or ministries are willing to put aside their sectoral or institutional egos. Political support from top-level officials is needed to encourage this collaboration among stakeholders.

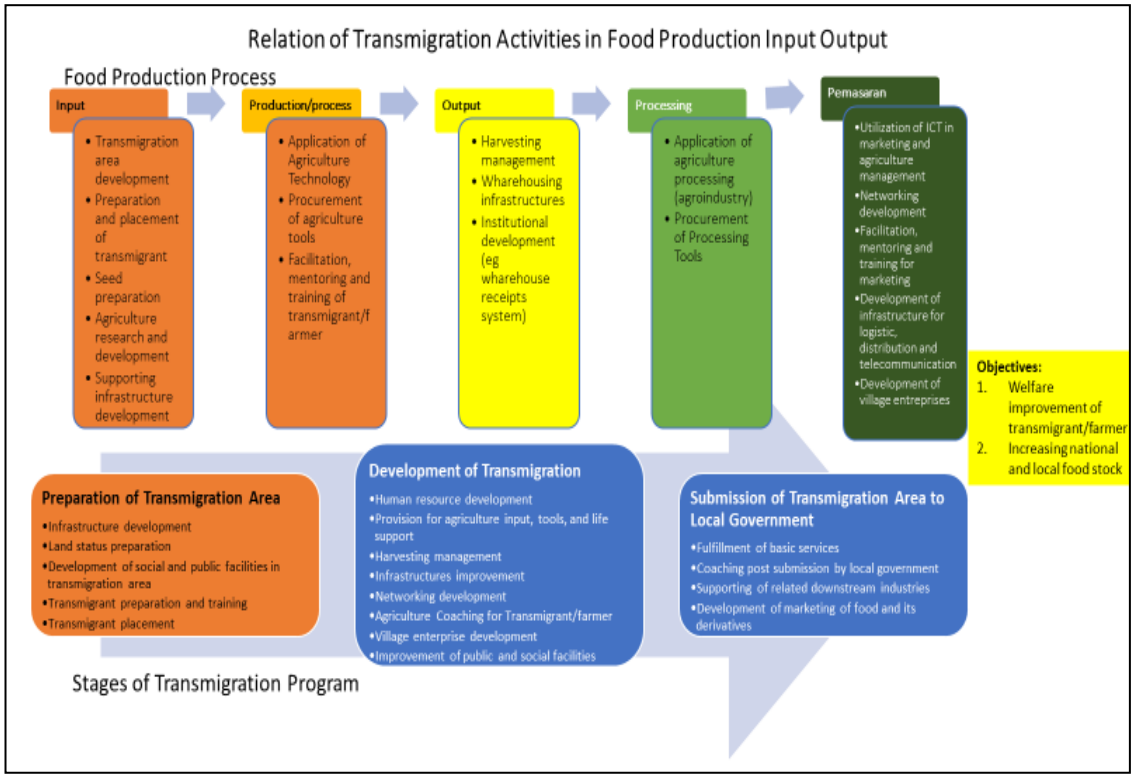


Figure 12. Transmigration Development in relation to Food Production Process

4.2.2. Transmigration Areas' Management

The management of transmigration areas is the second challenge that the government needs to pay attention. So far, the managers of the transmigration settlement units have not received optimal support in terms of funding, training, and facilities needed during the transmigrant guidance period. The settlement managers are the spearhead of the transmigration program. They deal directly with the transmigrant community and the people around the settlement units. They are multi-functional technical personnel who can act from agricultural extension agents to medical personnel and teaching staff. This is due to the limited number of government officials who assist the community daily. Therefore, strengthening transmigration settlement managers will help develop the transmigration areas into developed villages.

The management of transmigration areas also includes the management of data and information for the transmigration community and networking between the transmigrant community and the surrounding area. Accurately and regularly updated data and information will support the policy-making process at the regional and central levels so that decisions are made according to the needs in the field. Currently, transmigration data and information are yet to be optimal. Delay and lack of awareness in updating the data seem to cause such inefficiency. Development of networking by residential unit managers, especially networking in the economic sector, will encourage economic activities and agricultural production in transmigration areas.

4.2.3. Utilization of Suitable Agriculture Technology

To increase productivity, the introduction of suitable technology should be encouraged in the transmigration area. The combination between local wisdom and modern technology should improve productivity in all aspects of transmigrants' life. However, many new agriculture technologies end up in the research center, which does not significantly impact productivity. Many factors may contribute, such as limited field workers to disseminate the knowledge, limited supporting infrastructure, or limited funds to finance the dissemination of the new technology. Another factor contributing to the limitation of new technology implementation is that the technology is not suitable for local culture/habits or conflicts with local wisdom. In short, the challenge is to find technology that fits the situation in the field and can answer the limitations mentioned above since each transmigration area has its unique characteristics.

4.2.4. Transmigration Area Masterplan

A master plan is a reference for the project implementation according to the timeline and targets achieved. A good master plan will cover not only the existing condition but also the future goals of development. It also consists of safeguarding which should be complied with related stakeholders. The master plan also provides information on job division and responsibilities. The master plan should also incorporate the regional spatial plan and sectoral plan. Good collaboration among stakeholders will give a better master plan for the transmigration area. In relation to the local spatial planning, the collaboration among stakeholders will point to the optimal location for the transmigration area. Recently, many transmigration areas are located in remote areas requiring a lot of effort to develop the area into the expected one.

4.2.5. Quality of Human Resources

Another main challenge of the transmigration program is the quality of human resources. This covers transmigrant and government apparatus. Good preparation before departure and post-settlement will enable transmigrants to survive in the new area and improve their productivities. Coaching, mentoring, and training are necessary to boost the local economy. Better quality of transmigrant will produce better output, better innovations, and better development of the transmigration area.

Apart from transmigrant, the government apparatus that deals with transmigration programs should be addressed too. Quality government officers in the field will help transmigrant solve problems more effectively and efficiently. However, the rotation of the government officers in the field in many regions is too frequent and unplanned. This will hinder the progress of the transmigration program.

Both transmigrants and government apparatuses should be trained and coached during and after implementing the transmigration program. Training and coaching for human resources from the transmigration program can be grouped into several stages. The first stage is training and coaching human

resources for transmigration preparation. This stage includes training and coaching for introduction and adaptation to the new environment and homes in the transmigration area. Detailed training and mentoring consist of environmental adjustments, environmental stabilization, and efforts to become independent.

The next stage is training for transmigrants and transmigration area managers to become local champions. At this stage, transmigrants and program managers are trained and coached to focus on export-oriented food products and encourage the transmigration area to become centers of agriculture and agricultural processing. Besides, the program manager and transmigrants start to cooperate with the surrounding area to improve networking and competitiveness.

The last stage of human resources development takes place after transmigration areas become independent ones. At this stage, the training and mentoring should encourage the transmigration area to have regional competitiveness and have a more established network with other regions and business actors. It is expected that at this stage, the human resources in the transmigration area can be relied on for food processing and management to become the center for national and regional food production.

Conclusion

a. Food security is not only a national issue in terms of food stock; it is a multi-stakeholder forum, and Many alternatives can help tackle this issue. One alternative is the development of a transmigration program. The similar characteristic and their close relation to the food production process are among the main reasons why the transmigration program is expected to contribute to the food security issues apart from regional development contribution.
b. Based on the analysis, it can be concluded that the transmigration program has the potential to support national food security. Data analysis shows that the total contribution of food production through the transmigration program is above 10 percent on the national average (outside Java-Bali). However, it should be noted that the lack of support, especially in terms of budget allocation, is also one of the obstacles in optimizing the potential of the transmigration program.
c. To maximize the transmigration program in supporting food security, the government should address five challenges. These are (1) stakeholder cooperation, (2) transmigration area management, (3) utilization of suitable agriculture technology, (4) transmigration area masterplan, and (5) quality of human resources. By anticipating those challenges, the government will fulfill the pre-conditions needed before implementing a transmigration program. These pre-conditions are (1) fulfillment of minimum standard of basic services, (2) clear land legal status, (3) good and accessible connectivity infrastructures and mode of transportation, and (4) interregional cooperation.

Recommendations

The following recommendations should be considered to help the transmigration areas contribute to supporting food security programs:

a. There should be political support from high-level officials for the transmigration program, and this support should be interpreted into a presidential decree or law. Based on this decree/law, job division and job responsibility are defined among stakeholders and become references in implementing the transmigration program.
b. Training for transmigrant and government apparatus should be carried out before and during the implementation of the program. The training for transmigrants should equip them with knowledge of how to survive in and develop their new home. The training focus for the government apparatus should help the transmigrant achieve their targets and solve their problems effectively and efficiently.
c. A stakeholder forum, consisting of related ministries, should be established to solve the problems during the implementation program. This may take an informal forum, yet a regular discussion should be conducted to report the progress and find the best solutions for upcoming issues.
d. Based on point c, regular monitoring and evaluation should be carried out, and it should be based on the logical framework of the transmigration program.

References

Amanta, F., & Aprilianti, I. (2020). Ringkasan Kebijakan | Kebijakan Perdagangan Pangan Indonesia saat Covid-19. Retrieved from CIPS Indonesia website: https://www.cips-indonesia.org/post/ringkasan-kebijakan-kebijakan-perdagangan-pangan-indonesia-saat-covid-19

Badan Ketahanan Pangan. (2019). *Indeks Ketahanan Pangan Indonesia 2019*. Jakarta: Ministry of Agriculture.

Badan Pusat Statistik. (2015). Data Produksi Tanaman Pangan.

Badan Pusat Statistik. (2019a). Data Impor Beras.

Badan Pusat Statistik. (2019b). Data Impor Kedelai.

Badan Pusat Statistik. (2020). *Produk Domestik Regional Bruto Per Kapita Atas Dasar Harga Berlaku Menurut Kabupaten/Kota di Provinsi Kalimantan Tengah (Juta Rupiah) 2017-2019*.

Badan Pusat Statistik. (2021). *Hasil Sensus Penduduk 2020*.

Bappenas. (2020). *Arah Kebijakan Pembangunan Transmigrasi Tahun 2020-2024 (Unpublished).*

BULOG. (2014). Ketahanan Pangan.

Dabukke, F. B. M., & Iqbal, M. (2014). Kebijakan pembangunan pertanian Thailand, India, dan Jepang, serta implikasinya bagi Indonesia. *Analisis Kebijakan Pertanian*, *12*(2).

Directorate of Food and Agriculture, B. (2020). *Kebijakan Pertanian dalam Mendukung Pembangunan Kawasan Transmigrasi. Presented in Sharing Session of Transmigration Program. Jakarta.*

Dirman, E. N., Saleng, A., & Sapiddin, A. S. A. (2018). Food Agricultural Land Legal Protection to Improve Food Security in Indonesia. *IOP Conference Series: Earth and Environmental Science2*, *196*(1).

Economist Intelligence Unit. (2019). Global Food Security Index.

Food and Agriculture Organization. (2020). *FAOSTAT*.

Gomiero, T. (2016). Soil Degradation, Land Scarcity and Food Security: Reviewing a Complex Challenge. *Sustainability*, *8*(3). https://doi.org/https://doi.org/10.3390/su8030281

Hadiprayitno, I. I. (2020). Food security and human rights in Indonesia. *Development in Practice*, *20*(1).

Hermanto, H. (2015). Ketahanan Pangan Indonesia di Kawasan ASEAN. *Forum Penelitian Agro Ekonomi*, *33*(1).

Junaidi, J., Rustiadi, E., Sutomo, S., & Juanda, B. (2012). Pengembangan Penyelenggaraan Transmigrasi di Era Otonomi Daerah: Kajian Khusus Interaksi Permukiman Transmigrasi dengan Desa Sekitarnya. *Visi Publik*, *9*(1).

Kementerian Desa, Pembangunan Daerah Tertinggal, dan T. (2019). *Transmigrasi Mendukung Ketahanan Pangan. Unpublished*.

Kulsum, K. U. (2020). Ketahanan Pangan: Sejarah, Perkembangan Konsep, dan Ukuran.

Masniadi, R., Angkasa, M. A. Z., Karmeli, E., & Esabella, S. (2020). Telaah Kritis Ketahanan Pangan Kabupaten Sumbawa dalam Menghadapi Pandemi Covid-19. *Indonesian Journal of Social Sciences and Humanities*, *1*(2).

Neilson, J., & Wright, J. (2017). The state and food security discourses of Indonesia: Feeding the bangsa. *Geographical Research*, *55*(2).

Nugraha, A. T., Hasan, S., & Samantha, Y. (2015). Model Pengembangan Kawasan Transmigran, Kecamatan Waplau, Kabupaten Buru, Provinsi Maluku. *Agribusiness Journal*, *9*(1).

Patunru, A., & Ilman, A. S. (2020). Ekonomi Politik Kebijakan Beras di Indonesia: Perspektif Masyarakat Ekonomi ASEAN. *Center for Indonesian Policy Studies*.

Permatasari, I. A., & Wijaya, J. H. (2018). The Comparison of Food Policy Era the Leadership of Soeharto and Susilo Bambang Yudhoyono. *Jurnal Kebijakan Pembangunan Daerah*, *2*(1).

Piesse, M. (2016). Food security in Indonesia: A continued reliance on foreign markets. *Independent Strategic Analysis of Australia Global Interests*.

Pribadi, A. (2020). *Transmigrasi: Solusi Ketahanan Pangan di Tengah Pandemi Covid-19. Presented in Webinar Ketransmigrasian: Transmigrasi – Solusi Ketahanan Pangan di Tengah Pandemi Covid-19*. Jakarta.

Rahmawati, Y. D. (2020). The capacity of Kulon Progo Regency Government in efforts to self-sustaining economic. *The Journal of Indonesia Sustainable Development Planning*, *1*(2). https://doi.org/10.46456/jisdep.v1i2.56.

Republic of Indonesia. (2009). *Undang-Undang No. 29 Tahun 2009 tentang Perubahan Undang-Undang No. 15 tahun 1997 tentang Ketransmigrasian*.

Republic of Indonesia. (2012). *Undang-Undang No. 18 Tahun 2012 tentang Pangan*.

Republic of Indonesia. (2018). *Peraturan Presiden No. 50 Tahun 2018 tentang Koordinasi dan Integrasi Penyelenggaraan Transmigrasi*.

Republic of Indonesia. (2020). *Peraturan Presiden No. 86 Tahun 2020 tentang Rencana Kerja Pemerintah Tahun 2021*.

Republik Indonesia. (2017). *Undang-Undang No. 17 Tahun 2007 tentang Rencana Pembangunan Jangka Panjang Nasional Tahun 2005-2025*.

Rigg, J., Phongsiri, M., Promphakping, B., Salamanca, A., & Sripun, M. (2020). Who will tend the farm? Interrogating the ageing Asian farmer. *The Journal of Peasant Studies*, *47*(2). https://doi.org/https://doi.org/10.1080/03066150.2019.1572605

Rozaki, Z. (2020). COVID-19, Agriculture, and Food Security in Indonesia. *Reviews in Agricultural Science*, *8*.

Sutrisna, T. (2020). Berlaku 14 hari, penerapan PSBB di Jakarta sampai 23 April 2020.

Syaukat, Y. (2011). The impact of climate change on food production and security and its adaptation programs in Indonesia. *J. ISSAAS*, *17*(1).

The Economist Intelligence Unit. (2019). Global Food Security Index.

Timmer, P. (2004). Food security in Indonesia: current challenges and the long-run outlook. *Center For Global Development Working Paper*.

Toffolutti, V., Stuckler, D., & McKee, M. (2020). Is the COVID-19 Pandemic Turning Into a European Food Crisis? *European Journal of Public Health*, *30*(4). https://doi.org/https://doi.org/10.1093/eurpub/ckaa101

United Nations. (2019). *World Population Prospects 2019*.

Vel, J. A., McCarthy, J. F., & Zen, Z. (2016). The conflicted nature of food security policy: Balancing rice, sugar and palm oil in Indonesia. *In Anthropological Forum*, *26*(3).

Wiroyudo, A. (2019). *Panduan Penyusunan dan Pelaksanaan Perencanaan Transmigrasi Terpadu. Direktorat Daerah Tertinggal, Transmigrasi, dan Perdesaan, Kementerian Perencanaan Pembangunan Nasional.*

Vol. 2 No. 1- April 2021

E-ISSN: 2722-0842 | P-ISSN: 2721-8309

Available online at
http://journal.pusbindiklatren.bappenas.go.id/

Commentary Paper

Which Pathways Should Indonesia Follow to Achieve Its Energy Development Goals into the Future?

Hanan Nugroho

Ministry of National Development Planning/Bappenas
nugrohohn@bappenas.go.id

1. Introduction

Indonesia already has a plan for its energy sector development far into the future. Based on the forecast of the future energy demand (2025 and 2050), the plan offers scenarios of meeting those energy needs with certain types of energy and their targeted shares. The types of energy used to meet the increasing demand are grouped into four clusters: coal, oil, natural gas, and renewable energy. The supply scenario takes into account the wealth of Indonesia's energy resources and orders that the share of renewable energy will increase and become the largest by 2050.

The plan is stipulated in the Regulation of Government No. 79 of 2014 concerning National Energy Policy. It has been explicated into Presidential Regulation No. 22 of 2017 concerning the General Plan of National Energy (RUEN) (Presiden Republik Indonesia, 2017). The RUEN has even been broken down into a number of Regional Energy General Plans (RUED) at the provincial level in the form of Regional Regulations (PERDA) (Dewan Energi Nasional RI, 2021).

Despite its Energy Policy, Indonesia is also bound by several international agreements relating to environmental protection, climate change, and sustainable development, the world's agenda affecting energy plans. For example, goal number 7 of the Sustainable Development Goals (SDGs), which is about "Affordable and Clean Energy", has also been explicated into targets and ways of achieving them by the Indonesian government for Indonesia's context (Kementerian PPN/ Bappenas, n.d.)

Not all of Indonesia's energy policies and the various world development agendas are in the same pathways to achieve their goals. This becomes obvious when the analysis is carried out in more detail. However, different thoughts from various competent sources might be considered to improve the current Indonesia's energy planning. However, it should not fundamentally affect matters that have been previously considered in Indonesia's energy planning for the future.

ARTICLE INFO

Received: March 29, 2021
Received in revised form: April 15, 2021
Accepted: April 15, 2021

doi: 10.46456/jisdep.v2i1.118

JISDeP - The Journal of Indonesia Sustainable Development Planning
Published by Centre for Planners' Development, Education, and Training (Pusbindiklatren),
Ministry of National Development Planning/ National Development Planning Agency (Bappenas), Republic of Indonesia

Address: Jalan Proklamasi 70, Central Jakarta, Indonesia 10320
Phone: +62 21 31928280/31928285
Fax: +62 21 31928281
E-mail: journal.pusbindiklatren@bappenas.go.id

Supported by Indonesian Development Planners Association (PPPI)

2. The UN-ESCAP's Energy Development Pathways for Indonesia

One of the 17 goals of the SDGs is goal number 7, "Affordable and Clean Energy" which aims "to ensure access to modern energy that is affordable, reliable and sustainable for all." Achieving this goal will certainly depend on each country's energy-economy-environment problems, even for different regions within a country.

This report (United Nations, 2020) contains recommendations from the United Nations Economic and Social Commission for Asia and the Pacific (UN-ESCAP) to Indonesia regarding steps that the country should take to carry out its energy transition while achieving goal number 7 of the SDGs targeted for 2030. Efforts to achieve goal number 7 will be related to achieving other SDGs goals, such as goal number 13 on "Climate Action."

The critical recommendation presents several energy scenarios. These scenarios would enable Indonesia to achieve the SDG 7 target by 2030 and Nationally Determined Contribution (NDC) of the 2015 Paris Agreement for committed action/emission reduction target in response to climate change. The UN-ESCAP has developed the National Expert SDG Tool for Energy Planning (NEXSTEP) to produce recommendations specific to Indonesia and other recommendations for other countries.

The report argues that Indonesia's plans to reduce its heavy reliance on fossil fuels to an increasing share of renewable energy in its energy mix are good enough. However, more significant efforts must be taken to achieve its intended goals widely. Among the large countries, Indonesia is on track to achieve "near 100%" electricity access by 2020.

It is a complex and difficult task to link energy needs with the economic growth expectation, reduce emissions and achieve other SDGs' goals. After examining Indonesia's energy-economy data and policy, the report offers several policy recommendations for Indonesia's policymakers to consider, especially in dealing with energy transition to achieve SDG 7 and NDC targets.

First, the recommendations include efforts to achieve universal access for clean cooking that have to increase by three-fold. The report challenges the current plan for expanding city gas networks (that would bring Indonesia to achieve universal access by around 2025) by pointing that the plan will be too costly and time-consuming. On the contrary, this report offers extensive uses of the electric cooking stove, particularly for JAMALI (Java-Madura-Bali) and areas where there is a surplus in electricity supply.

The second recommendation is about accelerating energy conservation efforts. The current target of 1 percent energy intensity reduction is seen as offering a cost-effective way to reduce energy consumption and energy expenditure; however, Indonesia must be strived to achieve this goal well. Third, Indonesia's energy sector should reduce its greenhouse gas emissions by 18%, a higher figure than the country's original target for emission reduction as proposed in its NDC.

Fourth, Indonesia should develop no more new coal-fired power plants as they are no longer cost-effective than renewable energies, and the plants should be ceased to avoid emissions lock-in. The last, Indonesia should continue to remove fossil fuel subsidies and encourage the issuance of green financing.

3. Which pathways? Responses to the recommendations

Indonesia should stick to and implement its natural gas infrastructure development programs, including the provision of clean cooking facilities for its tens of millions of households. Indonesia is among the most successful in the world at shifting household cooking fuels from kerosene to LPG, accustoming tens of millions of households to gas cooking. However, heavy reliance on LPG has resulted in the country increasingly importing LPG, even though Indonesia has quite sizeable natural gas reserves, which have not yet been developed for fuel in household cooking and other uses. Although investment for natural gas infrastructure development is expensive, carrying out infrastructure development and delivering natural gas is the right pathway Indonesia should take.

Electric stoves can be introduced, but the outreach will be limited and require a long-term plan because the current electricity is generated mainly by coal power. Its use is also currently limited to Java island due to its excess in electricity supply. It is still far away for renewable energy to replace coal in Indonesia. Therefore, sticking to natural gas for cooking is an appropriate medium-term pathway option.

Energy conservation is indeed an effort that must be widely promoted in Indonesia, considering the potential for energy conservation is significant in various sectors of energy use and the process of producing energy. However, support in the form of regulations, institutions, and companies engaged in energy conservation (ESCO: energy services company) is still very limited and needs to be continuously

developed. Many of the energy conservation efforts would be “low to no cost” and only need a small lifestyle change, for example, by shifting to take public transport than that of passenger cars (Nugroho, 2018b)

The recommendation that Indonesia should increase its target to reduce GHG emissions from its energy sector is good. However, it is also important to consider that the county has other priorities for its energy security, namely expanding energy access for many of its population who have not yet had access to energy services (Nugroho, 2015). Directly developing renewable energy with low carbon emissions may not be the correct answer to the challenge of widespread energy access in the archipelago (Nugroho & Rustandi, 2020; Pratama & Purwanto, 2017).

Indonesia will reduce its coal exploitation, but eliminating coal, including in power generation, is a complex proposal that is difficult to implement for a country rich with coal resources (Nugroho, 2018a). While coal is still a low-cost energy source that is relatively abundant in the country, Indonesia will continue to rely on it to grow the economy until affordable and abundant renewable energy sources can be provided.

Reducing fossil fuel subsidies is a challenge that Indonesia continues to face since removing subsidies for kerosene, diesel, and gasoline, not to mention reducing subsidies for LPG and biodiesel. It seems that the challenge of reducing energy subsidies will endure in Indonesia.

Indonesia needs to promote green financing (including green bonds) to finance renewable energy development, but it needs first to solve fundamental domestic problems. So far, Indonesia has not effectively utilized international financing sources for renewable energy development due to its weak institutional capacity.

Which pathways Indonesia should take will depend on the goals set previously. Different goals lead to the consequences of following different pathways (Nugroho, 2019)

Although many recommendations have been made regarding Indonesia's energy policy and related matters, Indonesia needs to remain consistent with its developed pathways (especially those that are legally binding). National energy policies need to be interpreted well at the regional level, given that this vast archipelago country is endowed with various energy sources but faces different energy, economic and environmental problems in each region.

Commentary on a report:

Energy Transition Pathways for the 2030 Agenda SDG7 Roadmap for Indonesia (United Nations – ESCAP, 2020)

References

Dewan Energi Nasional RI. (2021). Perkembangan Penyusunan RUED Provinsi 34 Provinsi. Retrieved from Dewan Energi Nasional RI website: https://www.den.go.id/index.php/dinamispage/index/863-perkembangan-penyusunan-rued-provinsi-34-provinsi.html

Kementerian PPN/ Bappenas. (n.d.). Sekilas SDGs. Retrieved from Kementerian PPN/ Bappenas website: http://sdgs.bappenas.go.id/sekilas-sdgs/

Nugroho, H. (2015). Redefining Indonesia's Energy Security: Efforts to Adopt Cleaner, More Sustainable Energy Strategies. In *National Bureau of Asian Research: Indonesia, a Regional Leader in Transition* (pp. 46–59).

Nugroho, H. (2018a). Steep Road: Energy Transition and The Role of Development Planning in Indonesia. *Prisma Journal of Social Economy Thoughts*, *37*(1), 3–19.

Nugroho, H. (2018b). *Thought on Indonesian Energy Issues & Policies*. Bogor: IPB Press.

Nugroho, H. (2019). Indonesia's Energy Development: Evaluation of The 2015-2019 Medium-Term Development Plan and Outlook for That of 2020-2024. *The Indonesian Journal of Development Planning*, *3*(3), 266–272.

Nugroho, H., & Rustandi, D. (2020). *An Analysis of The Possibility to Achieve The Specified Indonesian*

Renewable Energy Development Target: Status and Proposal for The 2020-2024 National Medium-Term Development Plan. Hawaii: The IAFOR International Conference on the Sustainability, Energy & the Environment.

Pratama, Y. W., & Purwanto, W. W. (2017). *Analysis of Indonesia's Renewable Energy Policy: Status, Barriers, and Opportunities*. Depok: University of Indonesia Press.

Presiden Republik Indonesia. *Peraturan Presiden RI No. 22 Tahun 2017 tentang Rencana Umum Energi Nasional*. , Pub. L. No. 22 (2017).

United Nations. (2020). *Energy Transition Pathways for the 2030 Agenda SDG7: Roadmap for Indonesia*. United Nations Publication.

JISDeP
The Journal of Indonesia Sustainable Development Planning

VOL. 2
NO. 2
will be published in
AUGUST 2021

E-ISSN: 2722-0842 | P-ISSN: 2721-8309

CALL FOR PAPERS

About The Journal

The Journal of Indonesia Sustainable Development Planning (JISDeP) is a journal published by Centre for Planners' Development, Education, and Training (Pusbindiklatren), Ministry of National Development Planning/National Development Planning Agency (Bappenas) and supported by Indonesian Development Planners Association (PPPI).

This journal aimed at studying the issues of sustainable development from around the world to later be used as policy material in sustainable development planning in Indonesia, developing countries, and the world in general. This journal absorbs theoretical scientific studies as well as empirical experiences from researchers around the world, primarily from researchers who specialize in developing countries, to then publish them all widely to international forums as an applicable and innovative knowledge.

This journal gives important weight to the issue of sustainable development planning with regard to the mental and spiritual development of the people of Indonesia and the people of the world in terms of politics, economics, social, culture, environment, peace and justice, energy, and other strategic issues about sustainable development planning.

.:: RESEARCH PAPER | .:: POLICY PAPER | .:: COMMENTARY | .:: BOOK REVIEW

Peer Review Process

JISDeP is an open access journal. All of the research article submitted in this journal will be provided in online version and can be free full downloaded. JISDeP also uses peer-review process by blind reviewer. The decision of accepted or not the article is determined by the agreement of both of editor's board and the reviewer.

Publication Frequency

JISDeP are published three times a year which are in April, August, and December of respective year.

Open Access Policy

This journal provides immediate open access to its content on the principle that making research freely available to the public supports a greater global exchange of knowledge. All articles published will be immediately and permanently free for everyone to read and download.

Guidance for Submission

1. The submission has not been previously published, nor is it before another journal for consideration (or an explanation has been provided in "Comments to the Editor").
2. The submission file is in OpenOffice, Microsoft Word, or RTF document file format.
3. Where available, URLs for the references have been provided.
4. The text is single-spaced; uses a 12-point font; employs italics, rather than underlining (except with URL addresses); and all illustrations, figures, and tables are placed within the text at the appropriate points, rather than at the end.
5. The text adheres to the stylistic and bibliographic requirements outlined in the Author Guidelines.
6. If submitting to a peer-reviewed section of the journal, the instructions in "Ensuring a Blind Review" have been followed.

Register and Login as Author to:
journal.pusbindiklatren.bappenas.go.id

BEFORE: **JUNE 15TH, 2021**

Indexed by: MORAREF, Google Scholar, Dimensions, Crossref, BASE, GARUDA

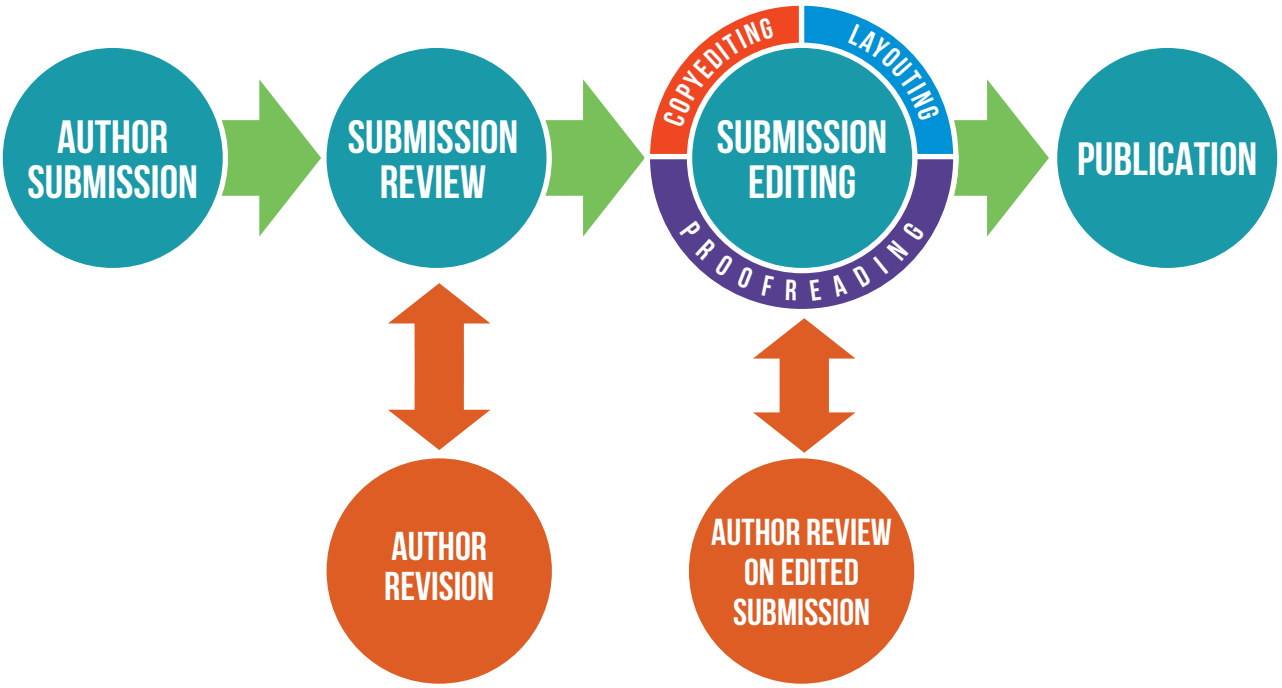
Published by: Kementerian PPN/Bappenas | Pusbindiklatren

Supported by: PPPI

Follow Us: JISDeP @jisdep

JISDeP
The Journal of Indonesia Sustainable Development Planning

PUBLICATION PROCESS



AUTHOR GUIDELINES

- As part of the submission process, authors are required to check off their submission's compliance with all of the following items, and submissions may be returned to authors that do not adhere to these guidelines.
- The submission has not been previously published, nor is it before another journal for consideration (or an explanation has been provided in Comments to the Editor).
- The submission file is in OpenOffice, Microsoft Word, or RTF document file format.
- Where available, URLs for the references have been provided.
- The text is single-spaced; uses a 10-point Calibri font; employs italics, rather than underlining (except with URL addresses); and all illustrations, figures, and tables are placed within the text at the appropriate points, rather than at the end.
- The text adheres to the stylistic and bibliographic requirements outlined in the Author Guidelines.
- If submitting to a peer-reviewed section of the journal, the instructions in Ensuring a Blind Review have been followed.

THE JOURNAL OF INDONESIA SUSTAINABLE DEVELOPMENT PLANNING (JISDeP)
Published by Centre for Planners' Development, Education, and Training (Pusbindiklatren), Ministry of National Development Planning/National Development Planning Agency (Bappenas), Republic of Indonesia
Address: Jalan Proklamasi 70, Central Jakarta, Indonesia 10320
Phone : +62 21 31928280/31928285/31928279 | Fax: +62 21 31928281
E-mail : journal.pusbindiklatren@bappenas.go.id

Available online at journal.pusbindiklatren.bappenas.go.id

E-ISSN (online)
9 772722 084002

P-ISSN (print)
9 772721 830006

THE JOURNAL OF INDONESIA SUSTAINABLE DEVELOPMENT PLANNING (JISDeP)
VOL. 2 No. 1 - APRIL 2021