

# Indonesia's Vaccine Diplomacy to the Indo-Pacific: Opportunities & Challenges

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## Abstract

The COVID-19 vaccine is one way to prevent the spread of COVID-19. Indonesia has produced Indovac, a COVID-19 vaccine made by Biofarma which has the opportunity to be distributed to countries in the Indo-Pacific Region. This article aims to explain the opportunities and challenges of Indonesia's vaccine diplomacy during the COVID-19 pandemic to the Indo-Pacific region through Biofarma. By using a vaccine diplomacy approach and qualitative methods with System Dynamic analysis, this article concludes that (i) The opportunity for Indonesia's vaccine diplomacy to the Indo-Pacific is 44% and (ii) The simulation results for all parameters have the opportunity to increase Indonesia's progress in the Indo-Pacific except for the parameters of cooperation with special actors vaccine. The challenges for Indonesia's Covid-19 vaccine diplomacy to the Indo-Pacific come from the United States, India, Japan, Australia and Singapore.

**Keywords:** Vaccine Diplomacy, Indo-Pacific, Indonesia, Biofarma.

COVID-19 has hit the Indo-Pacific Region. The population in the Indo-Pacific Region represents more than half of the world's human population with a total world population of around eight billion, the Asia-Pacific region alone which is part of the Indo-Pacific already has a population of around 4.3 billion people (UNFPA, 2022). Therefore, the threat of transmission of the COVID-19 virus is a serious issue in this region. In addition, there are countries in the Indo-Pacific region that have high population levels, such as Indonesia, the United States (US) and India (United Nations, 2022). This condition certainly makes the Indo-Pacific region has a considerable influence on the world economy and politics.

In November 2022, there were around 640 million confirmed cases of COVID-19 from 195 countries around the world, with an estimated death toll exceeding 6.6 million. Of these, the US and India are in the position of the two countries with the most cases, namely the US with more than 99 million confirmed cases and 1.1 million deaths. While India with more than 44.6 million confirmed cases and more than 530 thousand deaths (Worldometer, 2022). The data illustrates the seriousness of the COVID-19 threat, especially in the Indo-Pacific region. Without coordinated handling in the region, the spread of COVID-19 in the world will be difficult to control.

Countries in the East Asia and Pacific region were among the worst affected in the early days of the COVID-19 pandemic. High poverty rates exacerbate the impact of COVID-19 in the region. In addition, people in this region are also dominated by informal sector workers, migrants, and day laborers who have a low level of economic resilience, especially in the face of COVID-19. On a broader scale, the COVID-19 pandemic has disrupted the economic chains that have been integrated in the Asian region. The economic chain in question is the integration of trade between China, Japan, South Korea, Singapore, Malaysia, Thailand, Cambodia, Bangladesh, Myanmar, and Indonesia resulting in large economic losses to these countries (UNDP, 2020).

In addition to the severe economic impact due to the drastic reduction in the level of mobility of people and goods during the COVID-19 pandemic in the Indo-Pacific region, there are also secondary impacts that exist on access to health services, education, and gender gaps (Keck, 2021). Food security is also a serious threat during the COVID-19 pandemic in the Indo-Pacific region, farmers and fishermen in the region such as Indonesia, the Philippines, Timor-Leste, Papua New Guinea, and Pacific island countries find it difficult to move because of various policies aimed at minimizing the spread of the virus. Basically, COVID-19 has a negative impact on food supply chains from national to global levels which has the potential to produce adverse impacts on global food security both in the short and long term (ACIAR, 2020).

The COVID-19 vaccine is one of the efforts to reduce the spread of COVID-19. Several countries in the Indo-Pacific have produced COVID-19 vaccines, namely: the United States, India, Australia and Singapore.

United States. In the context of the capability to produce COVID-19 vaccines, the United States (US) produces two types of vaccines, namely the Moderna and Pfizer vaccines. Although, the Pfizer vaccine itself cannot be claimed to be purely US because there is a

contribution from Biontech from Germany. This is clearly different from Chinese vaccines that are created without interference from other countries. Then, in the context of vaccine distribution capabilities, until October 31, 2022, the US pledged to donate 1.1 billion doses of COVID-19 vaccines worldwide. Of this figure, 227 million doses have been completed, 430.5 million doses have been successfully delivered but have not been administered, and 442.2 million doses are still not delivered at all (Bown, 2022). When compared to China's contribution with the same variable, namely the number of vaccine doses that have been given to countries around the world, China is still ahead of about 73 million vaccine doses.

India. India's ability to manufacture vaccines has been highly competitive during the COVID-19 pandemic. India's growth in the vaccine segment has remained stable despite COVID-19 downsizing and optimising manufacturing processes. Over the past two decades, major pharmaceutical companies have invested heavily in improving their manufacturing capabilities, meeting enormous global and domestic demand. Therefore, India has emerged as the dominant force in vaccines for diseases such as measles, Bacillus Calmette-Guérin (BCG), and Diphtheria, Tetanus and Pertussis (DPT). For example, India accounts for nearly 90% of the global demand for measles vaccines. The growth resulted in India's dominance with 65-70% of the World Health Organization (WHO) vaccine requirement sourced from India. India now supplies about 60% of the global demand for vaccines. Biologicals and formulations including vaccines account for 77.5% of India's drug export portfolio. During the pandemic, by leveraging the vibrant vaccine manufacturing ecosystem India not only provided vaccines to 1.4 billion people but also served the world community by supplying 242 million people at low prices to 101 countries (Sharma, 2022).

Serum Institute of India Ltd. is the world's largest vaccine company that has produced 200 million stocks of Covid-19 vaccines in 2022

(Sanjai, 2022). COVAXIN, which is India's original COVID-19 vaccine developed and manufactured by Bharat Biotech in collaboration with the Indian Council of Medical Research (ICMR) - National Institute of Virology (NIV). This vaccine was developed using Whole-Virion Inactivated Vero Cell derivative platform technology. Inactivated vaccines do not replicate and therefore do not cause pathological effects. These vaccines contain dead viruses, are not capable of infecting people but are still capable of instructing the immune system to carry out a defensive reaction to infection (Bharat Biotech, 2022).

Australia. Biopharmaceutical company CSL manufactures the AstraZeneca vaccine in Australia. The Australian government provisionally approved the AstraZeneca vaccine for use in the country on February 15, 2021. In 2021 Australia had secured 53.8 million of those vaccines with 3.8 million proceeds from imports and 50 million produced domestically (Commonwealth of Australia, 2022). Australia currently relies on partnerships with international vaccine manufacturers to secure most vaccine supplies, including Pfizer and Moderna. Australia also has a number of research institutes and contract development and manufacturing organisations (CDMOs) that will produce candidates for domestic vaccine manufacturing. Australia also has ambitions to become a country with qualified vaccine production capabilities and has high competitiveness globally by 2030 (Arthur, 2022).

Singapore (2023). German COVID-19 vaccine company BioNTech SE together with Pfizer Inc are working with the Singapore government to build their vaccine production facilities in Singapore. This is the company's first vaccine production site in the Asian region and a production hub for the Asia-Pacific region. The vaccine production facility is planned to be fully operational by 2023 (Pisharody & Sharma, 2022). In addition, the French pharmaceutical company also plans to build a vaccine production

facility in Singapore with a total investment value of 474 million US dollars and is estimated to be operational by 2026. The success of the cooperation carried out by Singapore is influenced by various factors such as good economic growth potential, good infrastructure, process efficiency, friendly taxes, and a strategic location to safeguard the Asian market (Medina, 2021).

The existence of the COVID-19 vaccine is closely related to the hegemony fight between the United States and China. The onslaught of the "China Threat" narrative campaigned by the US has increased in the past decade. This action seems to confirm the magnitude of capabilities possessed by China that threaten the status quo of the US as the only superpower in the unipolar international system. As a first step towards superpower status, China is eyeing absolute dominance in the Indo-Pacific region (Mourdoukoutas, 2019). From the global economic dimension, China's threat to the US arises through the Belt and Road Initiative (BRI) which has succeeded in provoking the US to respond through several securitization measures (U.S. Embassy Jakarta, 2022). Now, China's threat to US dominance continues to the health security dimension, especially in terms of procurement of Covid-19 vaccines.

In terms of the number of countries receiving donations, the influence of the US is still inferior to China. In total 48 countries are recipients of US vaccine donations with the majority coming from countries in the Sub-Saharan Africa region with a total of 188 million vaccine doses. This number is outnumbered by countries receiving Chinese vaccine donations spread to 90 countries. In addition to Sub-Saharan Africa, US vaccine donations also reached 4 countries in the Indo-Pacific region including Indonesia, Cambodia, Fiji and Kiribati amounting to 39.1 million doses. If the US is only able to distribute COVID-19 vaccine donations to two regions, China has succeeded in reaching four regions including Latin America, Africa, Asia Pacific, and Europe (Bridge Consulting, 2022).

In addition, there are also analysis results that say that the US and China have so far not managed to gain dominance in the Indo-Pacific region related to the COVID-19 issue. The failure of the US and China in tackling COVID-19 in their respective countries is a major factor in the lack of hegemony between the two countries in the Indo-Pacific region. In addition, the success of other countries in the Indo-Pacific region in tackling COVID-19 on a national scale is a challenge for the U.S. and China in expanding their influence in the region. Basically, collective efforts through cooperation are the right way to resolve non-traditional security issues, and that is what countries in the Indo-Pacific region have done that make them less dependent on the US and China (deLisle, 2021).

Despite the hegemonic issues of China and the United States, the ability to develop COVID-19 vaccines gives producing countries the opportunity to develop networks globally, including Indonesia. In November 2022, the Indonesian government officially launched a COVID-19 vaccine called Indovac produced by Biofarma. Indovac is a COVID-19 vaccine from Indonesia produced by the Bio Farma company and has received emergency use authorization from the Food and Drug Supervisory Agency (BPOM) on September 24, 2022 for primary vaccination doses one and two for people over the age of 18 years. Indovac has also received halal certification from the Indonesian Ulema Council. The vaccine rollout was carried out in Bandung by President Joko Widodo on October 13, 2022. During clinical trials, Indovac had good results against the Wuhan, Delta and Omicron variants of COVID-19. As for the initial stage, Bio Farma targets the production of 20 million doses of the Indovac vaccine (Anna, 2022).

In the early stages of Indovac vaccine development, Bio Farma collaborated with the Baylor College of Medicine laboratory from Houston, Texas. Phase one (safety), phase two (efficacy), and phase three (efficacy) clinical

trials were conducted in Bandung, involving 175,360 and 4,050 volunteers, respectively. In immunobridging trials with comparison vaccines that have efficacy above 80 percent, the Indovac vaccine was shown to be noninferiority. This means that Indovac has better effectiveness than comparable vaccines. In October 2022, Bio Farma seeks to pursue the target of shortening the first 6.9 million doses of Indovac which must be available until the end of 2022, to be immediately distributed throughout Indonesia. This target is in order to meet the need for domestic booster vaccines in Indonesia (Trihusodo, 2022).

Can Indonesia expand its influence in the Indopacific through vaccine diplomacy? This article aims to explain the opportunities and challenges of Indonesia's vaccine diplomacy during the COVID-19 pandemic to the Indo-Pacific region.

#### Diploma Vaccine

Vaccine diplomacy can be better understood in the broader conceptual category of medical diplomacy, a term coined in 1978 by Peter Bourne, who was special assistant to the president for health issues. Bourne (1978) argues that health and medicine can play an important role as a means to improve international relations because certain humanitarian issues, especially health, can be the basis for establishing dialogue and bridging diplomatic barriers. Some examples of medical diplomacy activities include U.S. and Russian cooperation to combat polio. The Cuban state implements medical diplomacy as an instrument of foreign policy. As well as the delivery of medical equipment and personnel by countries stranded by natural disasters including the Chile earthquake in 1960, and the 2014 Ebola outbreak in West Africa (Bier & Arceneaux, 2020) (Gomez, 2014) (Groll, 2013).

In recent years, medical diplomacy has evolved into a field of study better known as global health diplomacy, motivated by a growing awareness that more and more health problems and their political, social, and economic

implications are broad and transcend national borders requiring action on a global scale to ensure public security (Kickbusch, Silberschmidt, & Buss, 2007). In another sense, at present the state cannot move alone in dealing with health issues (Cooper, 2003).

However, the term global health diplomacy continues to evolve conceptually leading to interdependence, cooperation, and mutual benefit. The conceptualization of health diplomacy leads to three things. The first is core diplomacy, which is formal negotiations between and between countries. The second is multistakeholder diplomacy, which is a negotiation between or among countries and other actors, not necessarily leading to a binding agreement. Third is informal diplomacy, which is the interaction between international public health actors and their counterparts in the field, including host country officials, non-governmental organizations, private sector companies, and the public (Katz, Kornbelt, Arnold, Lief, & Fischer, 2011).

Hotez (2014) defines vaccine diplomacy as encompassing almost all aspects of global health diplomacy that depend on the use or delivery of vaccines and includes the important work of Gavi, the Vaccine Alliance, as well as elements of WHO, the Gates Foundation, and other international organizations. Gavi, the Vaccine Alliance was established in 2000 to bring together the public and private sectors and partners UNICEF and WHO with the common goal of creating equal access to vaccines in poor countries. Furthermore, Hotez (2014) observes that the practice of vaccine diplomacy has existed since the invention of the vaccine itself, such as the event of how the smallpox vaccine of British doctor Edward Jenner was sent to France for successful smallpox inoculation during the war between Britain and France in the early 1800s. Supporting Hotez's statement, Shakeel (2019) defines vaccine diplomacy as a branch of global health diplomacy that promotes the use and delivery of vaccines to achieve larger global health goals and shared foreign policy goals.

Shakeel and colleagues' explanations are based on the WHO-led multilateral polio eradication programme 2016–2017 in Pakistan involving multiple actors including Pakistan's Ministry of Health, Regulation and Coordination and donors and technical partners including the U.S. CDC, World Bank, UK Department of Health, International Development (DFID), and Japan International Cooperation Agency (JICA).

Hotez (2014) further identifies vaccine science diplomacy as part of vaccine diplomacy. Vaccine science diplomacy, which represents a hybrid characteristic of global health diplomacy and science diplomacy, refers to the joint development of vaccines and related technologies, with the main actors usually having the status of scientists. In some cases, scientists may come from two or more ideologically opposed countries or countries actively engaged in hostile acts, as seen in the case of Jenner's smallpox vaccine. Hotez's definition of vaccine science diplomacy fits Katz's (2011) global health diplomacy framework, specifically the category of informal global health diplomacy based on peer-to-peer scientific interaction along with elements of science diplomacy in which the representative state projects power through its scientific prowess and reputation (Hotez, 2014), especially when other forms of dialogue or diplomacy are blocked (Ruffini, 2019). However, Katz's (2011) conceptualization of global health diplomacy does not consider the uniqueness of vaccines, especially in the context of a globally debilitating pandemic. Hotez (2014) rightly argues that the underlying theme of vaccine diplomacy and vaccine science diplomacy, is that vaccines are different from other medical or public health interventions.

In short, the definition and conceptualization of vaccine diplomacy before COVID-19 (Hotez 2014; Kelman 2019; Shakeel et al. 2019) as an instrument of conflict resolution, when viewed in conjunction with Katz et al.'s (2011) framework to explain global health diplomacy, ignoring the nation-state factor and the competitive element

featured in the current COVID-19 vaccine diplomacy race. Ontologically, China's vaccine diplomacy does not follow the conceptualization of pre-COVID vaccine diplomacy within the limited framework of multilateral conflict resolution. The conceptual tension between mutual benefit and self-interest becomes apparent when we apply the lens of nation branding, what Anholt (2015) has written as a metaphor to describe how effectively each nation-state competes with each other for favorable perceptions, be it through exports, governance, tourism, investment, culture and heritage, as well as in this case COVID-19 vaccines.

Lee (2021) argues that post-COVID-19 vaccine diplomacy refers more to being an instrument of soft power from countries, especially China. In this regard, China will not give up in its efforts to project influence through its national vaccines. The advantages of soft power, institutions, and social ecological factors that motivate China's vaccine diplomacy have been firmly established. Although China announced plans to provide its vaccines to COVAX, as three Chinese vaccine manufacturers applied to join the COVAX initiative to include 10 million doses by 2021, this has not deterred China from continuing to exercise soft power through vaccines outside the COVAX framework. The vaccine diplomacy race is far from over as China faces intensifying competition from Russia, India and the U.S., which face increasing pressure to react to Chinese vaccine diplomacy outside the COVAX framework.

## Method

This article uses a descriptive qualitative method with secondary data sources obtained from news from official websites, reports from the government and private sector and journal articles. The analysis uses System Dynamic to predict the opportunities & challenges of

Indonesia's vaccine diplomacy in the Indopacific. The model is built as follows:

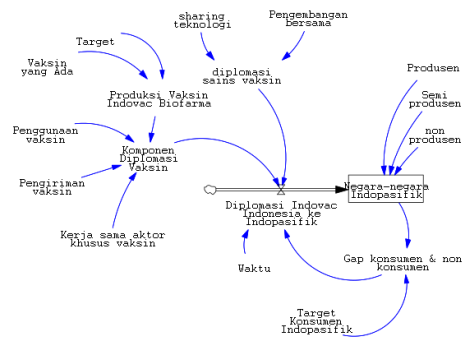


Figure 1. Indonesia's Vaccine Diplomacy Model to the Indopacific

Table 1. Details of Modeling Elements of Indonesia's Vaccine Diplomacy to the Indopacific

Variable	Parameter
Country Category	<b>Vaccine Manufacturers:</b> United States, India, Indonesia  <b>Semi-manufacturers:</b> Australia, Singapore  <b>Nonmanufacturers:</b> Bangladesh, Bhutan, Brunei, Cambodia, Fiji, Japan, Laos, Malaysia, Maldives, Myanmar, Nepal, New Zealand, Papua Newgenea, Philippines, Sri Lanka, Taiwan, Thailand, Timor Leste, Vietnam
Components of vaccine diplomacy	Vaccine production  Vaccine use  Vaccine delivery  Cooperation of vaccine-specific actors
Vaccine science diplomacy	Joint Development  Technology sharing



Figure 2. Indopassive Area Map  
Source: (Galloway, 2021)

The Indo-Pacific is one of the imaginary regional maps that holds a valuable position for international relations actors in recent times. As with other regional territorial boundaries, there are differences of understanding between actors in defining the Indo-Pacific region. In general from a geo-spatial perspective, the Indo-Pacific has a definition as an interconnected space between the Indian Ocean and the Pacific Ocean. Its area is disputed ranging from the east coast of Africa to the west coast of the United States, albeit with variations in definition depending on each actor and geographical position within the scope of the region. In a more functional sense, the interconnectedness and dependence within the region that lies between these two oceans is a product of the dynamics of globalization and trade. The Indo-Pacific region has the most important sea routes in the world, in which densely populated countries trigger high energy demand and create global importance and the political and economic center of the world (Das, 2019).

There are four countries considered to dominate the Indo-Pacific region. The four countries are the United States (US), Japan, India, and Australia. Furthermore, these four countries carry out an informal quadrilateral security dialogue initiative or also called the Quadrilateral Security Dialogue, therefore these four countries have the term "Quad". As for

ASEAN, which is a regional organization in the middle of the Indo-Pacific region, it has its own views related to the region written in the "ASEAN Outlook on the Indo-Pacific". Of the five actors mentioned, there are three definitions related to the Indo-Pacific region. The difference occurs between the US, Japan-India-Australia, and ASEAN (Yansim, 2020).

The term Indo-Pacific region gained popularity when former US Secretary of state Hillary Clinton used the term in 2010 in a speech. Australia was the first country to reference the term Indo-Pacific in the official 2013 Defense White Paper that listed the term 58 times. Then in the 2017 Foreign Policy White Paper there is a more specific definition related to the Indo-Pacific region. According to Australian calculations, the Indo-Pacific stretches from the eastern Indian Ocean to the Pacific, linked by Southeast Asia, home to nine of Australia's top ten trading partners (Galloway, 2021).

Regarding the issue of health security in this region, Australia is one of the countries that has the initiative in accommodating the issue. The initiative can be seen from The Australian Government's Indo-Pacific Centre for Health Security which was established on October 8, 2017. This effort is a renewal of the Australian Government's efforts to strengthen regional pandemic preparedness that began in 2005 under John Howard in the form of the Asia-Pacific Strategy for Emerging Infectious Diseases (APSED) (Kamradt-Scott, 2018). With \$300 million in funding from 2017-2022, The Australian Government's Indo-Pacific Centre for Health Security seeks to produce evidence-based planning and policies to help prevent epidemics, strengthen early detection capacity, and support rapid and effective national and international outbreak responses (Australian Aid, 2022).

In the context of COVID-19, the program has a role to play in supporting Australia's regional Covid-19 response. This effort began in 2020 to assist Australia's partner countries in developing and implementing national COVID-19 response plans, focusing on laboratory strengthening,

surveillance, disease impact modelling, medical supplies and health emergency response training. The program is also implementing support for Australia's COVID-19 vaccine access to countries in the Pacific and Southeast Asia, with funding of \$623 million through mid-2023. As of mid-2022, Australia has distributed nearly 50 million COVID-19 vaccines to partner countries (Australian Aid, 2022).

#### Softpower of Indonesia's Vaccine Diplomacy

Over time, countries in the Indo-Pacific region are trying to wean themselves off vaccine dependence. One of them is what Indonesia is doing by trying to develop vaccines independently. As a result, Indonesia has now succeeded in producing its own local vaccine called Indovac which has obtained emergency use authorization. In addition, another type of Indonesian-made vaccine called inavac is also ready to be distributed. The vaccine, which has another name for the red and white vaccine, is just waiting for emergency use authorization which is promised to come out in early October 2022 (Public Relations of the Ministry of State, 2022).

Since the beginning of the COVID-19 pandemic, Indonesia has carried out various types of vaccine diplomacy efforts in order to secure domestic vaccine stocks. Various types of these efforts such as through good cooperation that is bilateral to multilateral. In general, Indonesia has sought vaccine procurement through business schemes, grants, and cooperation (Wangke, 2021). Meanwhile, the basis of the argument used by Indonesia in the early days of COVID-19 vaccine diplomacy efforts is that health is the right of all humans (Setiawan, Affianty, & Tanjung, 2022). However, all these efforts have one factor that can complicate Indonesia's steps in fulfilling its national interests, especially related to the threat of COVID-19. This factor is dependence, because in this case Indonesia still depends on COVID-19 vaccine producing countries.

With the presence of Indovac as an independently produced COVID-19 vaccine, Indonesia's vaccine diplomacy strategy has the potential to change for the better. In addition to avoiding dependence on producing countries, with its ability in the field of production, Indonesia can use vaccines as an instrument of soft power. Vaccines can help grow the image of the Indonesian state towards a positive direction, such as using vaccines for diplomatic goodwill in the context of humanitarian assistance (Bier & Arceneaux, 2020). In addition, vaccine diplomacy is an attractive instrument for projecting soft power, or co-optation power, described by Nye (2008) as the ability to influence others to obtain desired outcomes through attraction without coercion or pay.

In line with the potential of Indonesia's vaccine diplomacy that has been written before, PT Biofarma together with the Ministry of Health continue to conduct studies to explore the possibility of the Indovac vaccine so that it can be given to children. Together with the Indonesian Ministry of Health, PT Biofarma has also held talks with WHO, looking at the possibility of Indovac being used for international donations, to African countries, where vaccination coverage is still low such as Nigeria, Zimbabwe, and Kenya (Trihusodo, 2022). Indonesia's vaccine diplomacy capability is supported by Biofarma in developing vaccines produced by Indonesia.

PT Bio Farma is an Indonesian state-owned pharmaceutical enterprise established by the Dutch East Indies government on August 6, 1980. The company is the only human vaccine manufacturer in Indonesia and the largest vaccine producer in Southeast Asia. In 2018, in order to welcome Indonesia as the Center of Excellence (CoE) of The Organization of Islamic Cooperation (OIC), Bio Farma has prepared concrete steps as a mechanism for cooperation between OIC member countries (Bio Farma, 2022). Meanwhile, the existence of CoE OIC plays an important role in supporting vaccine research and development and the availability of



biotech products that are more efficient in anticipating unpredictable disease outbreaks (Arief, 2018).

Basically, Bio Farma as a vaccine CoE provides its own potential for Indonesia such as the opportunity to promote pharmaceutical products, and encourage the independence of pharmaceutical products within the OIC framework. Another potential is to encourage collaboration between OIC countries in order to meet Indonesia's national interests (Iswati, Sari, & Rezasyah, 2022). Both potentials could affect the hegemony of COVID-19 vaccine diplomacy in the Indo-Pacific region. Changes in the hegemony of vaccine diplomacy can occur because Indonesia's capability in the production and distribution of COVID-19 vaccines through Bio Farma increases the number of vaccine producing countries in the Asia-Pacific region.

#### Opportunities & Challenges of Indonesia's Vaccine Diplomacy in the Indo-Pacific Region

Indonesia has the opportunity to conduct vaccine diplomacy to the Indo-Pacific Region with the Indovac vaccine as its diplomatic soft power. Based on System Dynamic analysis, vaccine diplomacy carried out by Indonesia can add one country every year. Under these conditions, by 2030, it is estimated that 11 out of 24 countries (about 46%) in the Indopacific will use the Indovac vaccine. The biggest challenges come from (i) COVID-19 vaccine-producing countries, namely: the United States and India, and (ii) countries that are collaborating with other countries to develop COVID-19 vaccines, namely: Australia and Singapore.

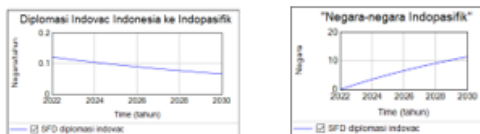


Figure 3. Indovac Vaccine Diplomacy Simulation in the Indo-Pacific Region

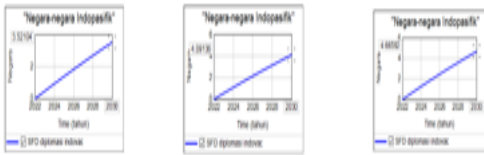
If Indonesia develops vaccine science diplomacy in the form of joint development of Covid-19 vaccines and technology sharing, it is

estimated that by 2030 there will be 17 countries (68%) that will use Indonesian-made COVID-19 vaccines. Joint development of vaccines is coupled with cooperating with 1 vaccine development company and at the same time sharing technology. In the process of developing the Indovac Vaccine, Indonesia collaborated with the laboratory of Baylor College of Medicine from Houston, Texas, United States. In addition to technology sharing and vaccine development, the cooperation provides shared market opportunities in the Indo-Pacific. For this reason, the addition of one partner in vaccine development is better done with partners in the Indo-Pacific Region, because in addition to improving vaccine technology and provision, it is also aimed at opening a common market.



(i) Initial  
(ii) 2x  
Figure 4. Simulation of Vaccine Science Diplomacy Development Parameters

Another effort that can be done to increase consumer countries in the Indo-Pacific is to increase the availability of vaccines. Figure 5 below shows the simulation results of increasing the number of vaccine production to provide vaccine stock/availability in increments of 2 to 3 times. The simulation results show that if the availability of vaccines is increased up to 3 times, it will increase by 3 to 5 consumer countries. This addition is understandable because countries that will become consumers will certainly consider vaccine stocks from manufacturers to ensure sustainable vaccine availability.



(i) initial (ii) 2x (iii) 3x  
Figure 5. Simulation of Parameters for Adding Vaccine Production

On the aspect of vaccine diplomacy, if the parameters of vaccine use are improved, the number of consumer countries in the Indo-Pacific will increase. Based on simulations, all countries in the Indo-Pacific will use Indonesian-made vaccines if usage is increased by 10x (see figure ii). Further increases will be stagnant, but vaccine distribution to Indopacific countries will be faster. For example, if vaccine use is increased by 11x, distribution throughout the region can be achieved by 2025.



(i) initial (ii) 10x (iii) 11x  
Figure 6. Simulation of Vaccine Use Parameters

On vaccine delivery parameters, a double increase would increase consumers in Indopacific countries to 18 countries. Distribution throughout the region will be achieved if the increase is made up to 4x.



(i) initial (ii) 2x (iii) 4x  
Figure 7. Simulation of Vaccine Delivery Parameters

On the parameters of cooperation between actors specifically handling Covid-19, Indonesia has collaborated with GAVI, COVAX, WHO, and UNICEF. The simulation results of this collaboration will be able to distribute the Indovac vaccine to 11 countries in the

Indopacific. If cooperation is increased by adding 1 actor, then consumer countries will actually decrease. Adding 1 actor, the consumer country drops to 9. If you add 2 actors, it decreases to 7, and so with the simulation results. This decline is understandable. For example, if Indonesia increases cooperation, the vaccines produced will be sent to the OI country operating, so that stocks for consumption in the Indopacific Region will decrease.



(i) awal (ii) +1 (iii) +2  
Figure 8. Simulation of Cooperation Parameters between Covid-19 Special Actors

## Conclusion

Indonesia has a good opportunity to develop vaccine diplomacy to the Indopacific region. This is supported by several aspects, namely: (i) the category of countries in the Indopacific Region, (ii) the components of vaccine diplomacy, including parameters: vaccine use, vaccine delivery, cooperation with special vaccine partners, and vaccine production, and (iii) vaccine science diplomacy in the form of joint development and sharing of vaccine technology.

Indonesia's chance of conducting vaccine diplomacy to Indopacific countries is 46% with the target of countries that have not produced their own Covid-19 vaccines, namely: Bangladesh, Bhutan, Brunei, Cambodia, Fiji, Japan, Laos, Malaysia, Maldives, Myanmar, Nepal, New Zealand, Papua Newgenea, Philippines, Sri Lanka, Taiwan, Thailand, Timor Leste, Vietnam. If Indonesia conducts vaccine science diplomacy with other vaccine companies, Indonesia's target will increase by 68%. If vaccine availability is expanded by 3x, it can increase consumer countries between 3-5 countries. Region-wide distribution is possible if vaccine usage is increased by 10x or vaccine shipments are increased by 4x. If vaccine usage is increased by more than 10x, it will speed up

distribution time throughout the Indopacific. The challenge of Indonesia's vaccine diplomacy to the Indopacific comes from vaccine producing countries, namely: the United States, India, Australia, and Singapore, and if Indonesia increases cooperation with special Covid-19 actors.

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