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# The Village Fund Program in Indonesia: Measuring the Effectiveness and Alignment to Sustainable Development Goals

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**Abstract:** This study analyzes the Indonesian Village Fund (VF) Program by mapping each VF-related activity to all 17 SDGs (Sustainable Development Goals), and then determines an SDG-based VF allocation in 2018, 2019, and 2020. This study used data from all villages in Indonesia and is the most comprehensive study in Indonesia to address the knowledge gap between VF allocation and SDGs by analyzing the distribution of the use of the VF. The objectives of this paper are: (1) to provide the extent of VF usage to provide evidence on whether this utilization was aligned with the targeted SDGs, and (2) to provide information regarding village activities funded by the VF that were linked to each SDG. The results from this analysis can be used to encourage the Government to socialize and provide an understanding of SDGs to village leaders. Moreover, since Indonesia has developed Village SDGs, which are based on national SDG targets and localization of global SDGs to adapt to local culture as well as social and environmental conditions, it is recommended that other developing countries could formulate similar strategies to help achieve their national SDG targets and to develop rural areas in a more targeted way by prioritizing the most relevant issues. The study shares lessons learned from Indonesian experience in managing fiscal policy to more than 70,000 autonomous villages through the village fund program in the last five years.

**Keywords:** Indonesia; village fund; sustainable development goals; fiscal policy; village development

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## 1. Introduction

To reduce inequality among countries and improve quality of life, the United Nations introduced a new series of goals called Sustainable Development Goals (SDGs) in 2015, made up of 17 goals and 169 associated targets to be achieved over the next 15-year period 2016–2030. The 2030 agenda for sustainable development is a development plan carried out around the world to eradicate poverty, provide a decent life, and establish peace, which is to be fulfilled by 2030 [1]. However, the goals to be achieved in the 2030 Agenda depend on the entire global society being able to maximize synergies and deal with existing trade-offs [2].

Since the SDGs were announced, many stakeholders have expressed concern: are they achievable? Not only have countries' abilities to achieve the SDGs been called into question, but there also appear to be competing ideas and indicators within the SDGs that are difficult to reconcile. On the government side, operationalizing the SDGs within a government's budgetary framework, particularly in terms of spending, is a huge challenge.

The big question here is whether governments can help achieve the SDGs by allocating budgetary resources.

It has been argued that countries with large development gaps between rural and urban areas would face greater challenges in achieving the SDGs, particularly because the issues of poverty, agriculture, and public welfare are strongly linked to rural areas and contribute to the instability of developing countries [3]. To overcome the current gap, it is recommended that the implementation of the SDGs be carried out from the bottom up, with local governments playing an essential role in the realization of the SDGs [4]. The role of local government becomes very important in the overall development of rural areas, which require good local institutions to promote and create a sustainable environment [5]. Therefore, local governments need sufficient resources to implement regional development [4].

In this regard, Indonesia has embarked on a policy experiment since 2001 to empower local governments to autonomously create and implement their developmental agendas. Since 2015 there has been a more ambitious regional developmental policy which was handed over to the smallest level of government entities, for example, by enabling villages to manage their economic development programs under the auspicious Village Fund (VF) Program.

The objective of this study is to examine the relationship between the VF program and SDGs at the village level. To achieve the objective, we analyzed the VF program by mapping each VF-related activity to all 17 SDGs and also obtained the SDG allocation of the VF from 2018 until 2020. In this study, we measured the VF program by applying a mixed-method approach. We utilized a content analysis approach as a qualitative method to map/harmonize the categorization of the SDGs with the VF program activities and a quantitative approach to assess the score of the mapping process. These approaches were used to explain the relationship (alignment) between the two observed objects.

This study constructed VF and SDG maps for Indonesia from 2018 to 2020 and provided an overview of current village leaders' attention to SDGs through their preferences in using the VF, in order to support the national commitment to SDGs. The findings of this study have implications for stakeholders of the VF, especially regulators, by helping them gain useful insights related to the importance of developing guidelines to ensure that the utilization of VF is in line with and leads to the achievement of SDGs. Such guidelines would help village governments produce more targeted policies that are based on each village's environmental and social conditions, and supporting the SDGs as targeted by the Government of Indonesia (GoI). With a greater understanding of the SDG-related activities in villages, both village leaders and government can analyze which programs have the potential for collaboration and which programs still need to be improved.

We provide novel research and a better understanding of SDGs achievement at the country level in the following ways: (1) Researchers in this area generally use data from a limited number of villages; however, this study provides the most comprehensive sample size to date (70,000 villages); (2) We measured achievement of SDGs using village-level disbursements, while previous research used data aggregated at the national level; (3) This study measured the achievement of SDGs through monetary units (IDR) and the realization of activities at the micro-level in each village; (4) This study offers a better way to improve the transparency and accuracy of calculating SDGs achievement and applies to other countries; (5) Overall, this study approach offers a more comparable model and more precise cross-country analysis to measure SDGs achievement.

## 2. Program Overview

### *2.1. SDGs in Indonesia*

Presidential Regulation No. 59/2017, concerning the implementation of SDGs in Indonesia, mandated the Ministry of National Development Planning to provide the Roadmap of SDGs in Indonesia, and this SDGs implementation was also translated as the main directions of the Medium-Term National Development Plan (RPJMN). Unfortunately,

limited resources require the government to prioritize those goals with the highest leverage above others [6].

The SDGs and RPJMN are primarily derived from different perspectives. The RPJMN was designed based on regional issues concerning welfare and sovereignty, while SDGs centered on global issues related to the sustainability of the world [7]. However, the nine RPJMN goals are related to the SDGs. Therefore, by focusing on the RPJMN, the government also contributed to the national achievement of SDGs. Table 1 presents the linkages between the RPJMN and SDGs.

**Table 1.** Linkages between the RPJMN and SDGs.

| No | RPJMN Goals | SDGs |
|---|---|---|
| 1 | Bringing back the country to protect the people and provide security to all citizens | SDGs 9–10, 13, 16–17 |
| 2 | Establishing clean, efficient, democratic, and reliable governance | SDGs 5, 10, 16–17 |
| 3 | Building from the periphery to strengthen local areas and villages within the framework of a unitary state | SDGs 1–12 |
| 4 | Strengthening the country's presence in reforming the law enforcement system to be corruption-free, dignified and reliable | SDGs 5, 10, 14–16 |
| 5 | Improving the quality of human life and society | SDGs 1–4, 6, 8, 10 |
| 6 | Improving productivity and competitiveness in the international market | SDGs 8-11, 17 |
| 7 | Realizing economic independence by moving the strategic sectors of the domestic economy | SDGs 2, 6–9, 12–15 |
| 8 | A revolution of national character | SDG 4 |
| 9 | Strengthening diversity and cultural restoration | SDGs 5, 10, 16–17 |

Data adapted from: Rassanjani [7], modified by author.

To achieve the RPJMN goals, especially program number 3, the GoI launched the One Billion One Village program. The program aims to increase efforts to reduce poverty and inequality, increase the capacity of development planning and budgeting at the village level, empower communities, and improve rural infrastructure development, peace, public order services, and rural community services to develop social and economic activities, thereby encouraging community self-reliance and cooperation, increasing village community income through village-owned enterprises (BUMDesa), and increasing village independence and competitiveness.

### *2.2. The Village Fund Program*

According to Village Law No. 6/2014, the goal of village development is to improve the welfare of rural communities and their quality of life by providing basic needs, thus reducing poverty. As a result of the implementation of this Village Law, villages have the authority to plan and manage the needs of communities in accordance with local development priorities. With increasing financial support from the VF, the governance and economy of the villages should also improve. Essentially, the VF can be the basis for achieving village independence.

As the fourth most populous country in the world with more than 261 million inhabitants, according to data from Statistics Indonesia [8], approximately 10.14% of Indonesian population lived below the poverty line in March 2021. The poverty line is defined by the sum of the Food Poverty Line (expenditure on minimum food needs which is equivalent to 2100 kcal per capita per day) and the Non-Food Poverty Line (expenditure on basic needs such as housing, clothing, education, and health. This evidence shows that information is needed on activities in Indonesia related to the SDGs. Since rapid sustainable development is essential, knowledge is required that can help with development [9].

For that reason, the Village Fund (VF) program in Indonesia is considered a very important national program that includes many funds distributed by the government. Funds dis-

bursed totaled IDR20.76 trillion (USD1.4 billion) in 2015, IDR45.98 trillion (USD3.2 billion) in 2016, IDR60 trillion (USD4.2 billion) in 2017 and 2018, and IDR70 trillion (USD4.9 billion) in 2019. The VF was distributed directly to approximately 50% of the population that lived in 74,093 villages in 2015, 74,754 villages in 2016, 74,954 villages in 2017, and 74,953 villages in 2018 and 2019. The main stakeholders of the VF are the Ministry of Villages, the Ministry of Home Affairs, and the Ministry of Finance through the Directorate General of Fiscal Balance. These bodies have formulated various policies to ensure the effectiveness of the VF program.

The VF program also has an indirect purpose that contributes to the achievement of SDGs through SDGs financing. The VF is allocated, among other things, to support village infrastructure programs to improve accessibility to and build essential facilities. The policy design of the VF in Indonesia is similar to other rural development policies found in South Africa and the US, where community-centered development supported with financial and technical assistance helps enable better development of infrastructure and relevant business ecosystems [10,11]. This approach could work equally and equitably by providing opportunities for village governments to manage and utilize these funds for their needs; therefore, it is directly related to the SDGs.

In addition, there is a strong legal basis for the implementation of SDGs, i.e., Presidential Decree No. 59/2017, as well as through mainstreaming SDGs via the Medium-Term National Development Plan (RPJMN) as the basis to determine budget priorities and allocations. However, there is still some room for improvement of the VF program by the Fiscal Policy Agency. The Fiscal Policy Agency has the task of formulating, stipulating, and recommending fiscal and financial sector policies following laws and regulations [12]. The main problem is that the government has not provided any guidance or introduction related to SDGs for village governments to ensure that their VF management policies support the SDGs. Therefore, an improvement could be made by evaluating the utilization of the VF to achieve SDGs, which can be considered SDGs financing.

Accelerating village development has the potential to promote the achievement of the SDGs through various development agendas based on local needs. To achieve SDGs at the village level in the era of the COVID-19 pandemic, the Ministry of Villages issued Regulation Number 13/2020, which stipulates the priorities for village funds usage. In order to minimize social and economic impacts that might hamper village development due to the COVID-19 outbreak, the VF is expected to be allocated to support national economic recovery, national priority programs, and adaptation of new habits. These programs include villages without poverty and hunger, economic villages that grow evenly, villages that are concerned with health, environment, and education, women-friendly villages, and villages that are culturally responsive, to accelerate the achievement of the SDGs.

### *2.3. The Village Fund Program and Its Related Regulations*

Village Financial Management includes planning, implementation, administration, reporting, and accountability. In determining priorities for the use of VF, it is necessary to pay attention to the principles. The principles of setting priorities for the use of VF include:

- Justice: prioritizing the rights and interests of all village residents without discrimination.
- Priority needs: prioritizing the village's more urgent interests.
- Village authority: prioritizing the authority of the rights of origin and local authority at the village scale.
- Participative: prioritizing community initiative and creativity.
- Self-management and based on village resources: implementation independently with the utilization of village natural and local resources.
- Typology of the Village: considering geographical, sociological, anthropological, economic, and ecological characteristics. Based on the Regulation of The Minister of Village, Number 2/2016, there are five categories: Independent, Advanced, Developing, Disadvantaged and Very Disadvantaged.

The Village Development Index (IPD) has an important role as an indicator of village development. It is included in the 2015–2019 RPJMN, which states the development targets that must be achieved in the next five years. In 2019, 5000 disadvantaged villages were targeted to become developing villages and 2000 developing villages were to become independent villages.

The VF as a source of village income is managed within the framework of Village Financial Management. The Village Financial Management principles are (1) Transparency; (2) Accountability; (3) Participativeness; (4) Budgetary order and discipline (must refer to the rules or guidelines that underlie it).

Based on the Regulation of The Ministry of Finance No. 49/2016, the VF budget for each district/city is calculated using the following formula:

$$VF = BA + AF \quad (1)$$

where VF is the district/city Village Fund, BA is the basic allocation, and AF is the allocation formula. The calculation of each variable is explained in detail in the regulation.

In 2018, the Ministry of Villages set priorities for the use of the VF in 2019 through the Regulation of Ministry of Villages No. 16/2018. This regulation is more detailed and provides direction regarding the fields and types of village development activities. However, it does not mention the SDGs' targets and agenda. Soerjatisnanta and Natamihardja [13] mapped the SDG agendas to the VF priorities for 2019. Table 2 presents the comparison of 17 SDG agendas to the VF usage priorities.

**Table 2.** Comparison of SDG agendas to VF usage priorities.

| Goal | SDG Agendas | VF Priorities 2019 |
|---|---|---|
| 1 | No Poverty | • Improving economic income for poor families<br>• Poverty alleviation |
| 2 | Zero Hunger | • Development of rural food safety<br>• Improving agriculture in terms of food safety<br>• Construction of reservoirs/irrigation |
| 3 | Good Health and Well-being | • Meeting public health needs<br>• Prevention and management of stunting<br>• Improved nutrition |
| 4 | Quality Education | • Education and culture<br>• Early childhood education programs |
| 5 | Gender Equality | • Support for integrated service posts to assist pregnant women's and nursing mothers' health control<br>• Health in general<br>• Education in a standard of 12 years |
| 6 | Clean Water and Sanitation | • Clean water supply and sanitation |
| 7 | Affordable and Clean Energy | • Construction and development of basic infrastructure for energy development |
| 8 | Decent Work and Economic Growth | • Development of superior village products<br>• Establishment and development of products |
| 9 | Industry, Innovation, and Infrastructure | • Procurement, construction, development, and maintenance of village infrastructure as determined by village authorities |
| 10 | Reduced Inequalities | • Increasing sustainable employment<br>• Development of non-agricultural economic businesses |

**Table 2.** *Cont.*

| Goal | SDG Agendas | VF Priorities 2019 |
|---|---|---|
| 11 | Sustainable Cities and Communities | • Improving the environment and settlements<br>• Improving transportation |
| 12 | Responsible Consumption and Production | • Improving agriculture in terms of food safety<br>• Productive scaling of agricultural business including aspects of production, distribution, and marketing |
| 13 | Climate Action | - |
| 14 | Life Below Water | - |
| 15 | Life on Land | • Managing outcomes of natural and social disasters<br>• Environmental preservation |
| 16 | Peace, Justice, and Strong Institutions | • Prevention of social conflict<br>• Information and communication |
| 17 | Partnership for The Goals | - |

Source: Data from Soerjatisnanta and Natamihardja [13], modified by author.

### *2.4. Village SDGs*

In 2020, the Ministry of Villages formulated a set of goals as the reference for village development in 2020–2024, called Village SDGs, which were based on national SDG targets and localization of the global targets. With the issuance of Regulation of Ministry of Villages No. 13/2020 on Priority Use of the Village Fund 2021, the Ministry of Villages stated that the IDR72 trillion VF in 2021 would be directed to achieve the Village SDGs.

According to the regulation, there are 18 goals set in the Village SDGs, which are: (1) Villages without poverty; (2) Villages without hunger; (3) Healthy and prosperous villages; (4) Quality education in villages; (5) Gender equality in villages; (6) Villages with clean water and sanitation; (7) Villages with clean and renewable energy; (8) Employment and rural economic growth; (9) Innovation in village infrastructure; (10) Villages without discrepancies; (11) Sustainable village residential areas; (12) Villages with sustainable consumption and production; (13) Villages with climate change control; (14) Village marine ecosystems; (15) Village land ecosystems; (16) Peaceful and just villages; (17) Partnerships for village development; (18) Dynamic village institutions and adaptive rural culture.

Each of these goals has its own targets to be achieved. The 18th goal is an additional goal, as according to the Ministry of Villages, village development has to be based on the local culture of each village [14]. It was also stated that the contribution of Village SDGs to the achievement of national SDGs could reach 74% [15], which was calculated by the Ministry of Villages based on two aspects: a population aspect (43% of Indonesians live in villages) and a territorial aspect (91% of Indonesia's territory is rural areas) [16]. However, the achievement of Village SDGs during COVID-19 pandemic will be difficult. Therefore, as stated in Regulation of Ministry of Villages No. 13/2020, the Minister focused the VF priorities on the most critical issues, namely: (1) Villages without poverty; (2) Villages without hunger; (3) Healthy and prosperous villages; (4) Gender equality in villages; (5) Villages with clean and renewable energy; (6) Equitable village economic growth; (7) Villages with sustainable consumption and production; (8) Peaceful and just villages; (9) Partnerships for village development; (10) Dynamic village institutions and adaptive rural culture.

## 3. Literature Review

### *3.1. Previous Studies on the Village Fund and SDGs*

In the case of Indonesia, research on SDGs has increased significantly [17]. There are several studies concerning VF and SDGs implementation in Indonesia that have been undertaken recently. The first is a study by Yazid et al. [18] that looks at how the results of development are sourced from the VF and the achievement of SDGs from the results of development funded by VF. They found that the distribution of the VF contributed to a

decline in the number of rural poor people and an increase in the number of developing and independent villages.

Dwitayanti et al. [19] also looked at the impact of VF program implementation on welfare in Indonesia. They found that the VF program contributed to the level of community welfare through infrastructural development of educational, health, and other community facilities, as well as more employment opportunities through development projects that could increase the community income. However, Kadafi et al. [20] found that the VF still tended to be used for the construction of physical facilities and infrastructure therefore did not have a multiplier effect on improving the village economy. The results showed that the VF improved literacy rates by 70.6%, while it reduced poverty by only 12.7%.

In their study, Arifin et al. [21] found that the VF increased the number of village-owned enterprises (BUMDesa) in many regions. Nevertheless, communities' awareness and utilization of these BUMDesa remained low. There is little evidence that the existence of BUMDesa increased employment opportunities, as in villages most people work in the agriculture sector and there was no significant labor employment improvement in the studied villages.

Most existing research is focused on one or several specific SDGs, such as poverty reduction [18,20], village community welfare [19], and facilities/infrastructure development [18–20]. Typically, they assess SDGs achievement using non-monetary parameters, such as number of village-owned enterprises [21], length of roads/bridges built and units of facilities constructed [18], or statistical data [19,20]. Additionally, some are based on a case study in a particular region, namely Kadafi et al. [20] which studied 96 cities/regencies in Indonesia that have underdeveloped villages, and Akbar et al. [22] that specifically evaluated the achievement of several SDGs indicators in Deli Serdang District.

In general, these studies show that the VF program has been successful in developing villages and improving communities, but there are still areas in need of improvement. This may reflect the VF being applied to certain aspects and not others, and further study is needed on where the emphasis has been placed, particularly concerning SDGs. The main difference between this study and these prior studies is that this study analyzed all SDG indicators in all villages in Indonesia, whereas previous works focused on one or two SDG indicators and used a limited sample of villages. Furthermore, this study considered the reasons behind village decisions to use the VF for the SDGs, and the appropriateness of the use of the VF based on priority indicators according to existing regulations.

### *3.2. SDG Financing through the Village Fund*

The discussion in the previous section showed several studies on the Indonesian VF and helped show how important it is for the GoI to direct utilization of these funds for the achievement of SDGs, especially to achieve national targets. The studies showed that the VF contributed to poverty reduction in villages and increased several villages' status to developing and independent villages [18], influenced community welfare [19], helped redefine the practice of public participation [22], increased literacy rates [20], and helped increase economic growth through the development of village-owned enterprises [21].

Villages also have strong resources to support the achievement of SDGs through institutional and cultural approaches, where an institutional approach could help strengthen the development planning system, and a cultural approach could increase public participation in all related aspects [13]. Therefore, a village could unite and coordinate well to achieve targeted goals such as SDGs. The task for the central government and regulators is to prioritize the use of VF regulation that could guide villages to achieve SDGs at a regional level that is compatible with national SDG targets.

### *3.3. Village Development Programs in Other Countries*

In 2001, Thailand launched a program called the Thailand Village and Urban Revolving Fund. The purpose of this program was to provide Thai villages one million baht (approximately USD22,500 at the time) as working capital for local credit institutions [23].

In 2017, the government of Thailand allocated 35 billion baht (approximately USD1 billion) to the program, and in 2018 the budget was increased to 55 billion baht (approximately USD1.5 billion) [24]. In 2020, the government approved a budget of THB144 billion (USD4.7 billion) to stimulate economic growth. Unlike the Indonesian VF, the Thai VF acts as a microfinance institution that provides low interest rate loans primarily used to finance agricultural activities [25].

In China, there are urban and rural villages, in which urban villages are created by rural-to-urban migration; urban areas need low-cost housing units. For this reason, the government of China introduced an urban village redevelopment program to achieve a "city without urban villages" by formalizing and upgrading neighborhoods toward higher-cost properties [26]. China was also the country with the highest subsidies to the agricultural sector in 2016, with approximately USD212 billion, ahead of the European Union's USD100 billion and the United States' USD33 billion [27]. This was because the government desired to increase rural incomes through the agricultural sector and reduce inequality between rural and urban communities.

China's national budget for agriculture and rural areas in 2016–2019 was RMB6.07 trillion (approximately USD925.9 billion) to support basic agricultural supply, poverty reduction, and structural reforms in industry, and improve relevant links between agriculture and rural areas, and improvement of rural governance systems [28]. Another example is Malaysia's Rural Development Policy, which consists of ten goals, some of which are related to SDGs involving economic development, women, environment, and housing. However, they do not refer to SDGs specifically.

Compared to Indonesia, these three countries do not have a specific budget for each village government to be used and managed for village development. Instead, the policies of other countries are more focused on the development of villages via local government and their policies, while the Thailand VF is used as working capital for local credit schemes to finance agriculture sectors and economic growth in their villages. Based on this comparison, it can be said that Indonesia's VF is unique because it seems that no other country has a similar budget dedicated to village development assistance.

### *3.4. Comparison of Evaluation Methodologies Used in Previous Studies of Other Village-Related Funds*

This section conducted an analysis of several studies on village-related funds in other countries as well as in Indonesia. The evaluation methodologies for these programs are analyzed and summarized as shown in Table 3.

**Table 3.** Summary of Prior Studies' Methodologies.

| Authorship | Country/Program | Objects Analyzed | Program Contribution | Method Explanation |
|---|---|---|---|---|
| Arcand and Bassole (2008) [29] | Senegal/Programme National d'Infrastructures Rurales (PNIR) | The impact of the PNIR project in Senegal on access to basic services, household spending, and children's physical condition. | Improve access and consumption | They used difference-in-difference estimators as well as parallel trend assumptions to test the hypothesis' evolution over time. |
| Arifin et al. (2020) [21] | Indonesia/Village Fund (VF) | The impact of VF on village-owned enterprises and employment opportunities. | Improve the number of village-owned enterprises | They employed first difference and difference-in-difference, as well as parallel trend hypothesis testing for continuous treatment. |
| Aziz (2016) [30] | Indonesia/Village Fund (VF) | The effectiveness of VF: the achievement of objectives, timeliness, and benefits. | Improve the amount of infrastructure | They conducted analysis data on the amount of Village Funds and realization of Village Funds distributed nationally. |

**Table 3.** *Cont.*

| Authorship | Country/Program | Objects Analyzed | Program Contribution | Method Explanation |
| --- | --- | --- | --- | --- |
| Beath et al. (2015) [31] | Afghanistan/National Solidarity Programme (NSP) | The impact of the NSP on democratic processes, access to utilities, and economic welfare. | Improve the amount of infrastructure, but limited quality | They conducted randomized controlled trials across 500 villages to assess the impact. |
| Boonperm et al. (2013) [23] | Thailand/Village and Urban Community Fund (VF) | The impact of VF on incomes and spending. | Unlikely to decrease poverty | They conducted propensity score matching as well as using a fixed-effects/difference model to eliminate selection bias. |
| Chandoevwit and Ashakul (2008) [32] | Thailand/Village and Urban Community Fund (VF) | The impact of VF on household income, expenses, and poverty ratio. | Unlikely to decrease poverty | This study utilized propensity score matching and double difference to assess the impact of the program. |
| Chase and Sherburne-Benz (2001) [33] | Zambia/Zambia Social Fund (ZSF) | The effectiveness of ZSF on poor communities, access to education and health services, and community participation in addressing crucial development issues | Improve access and consumption | The primary source of this study was the Zambia Living Conditions Monitoring Survey with an additional survey module addressing issues on social infrastructure. The other approach was propensity score community matching, pipeline matching and with/without comparisons. |
| Deininger and Liu (2009) [34] | India/Self-Help Groups (SHGs) | The impact of the SHG-based micro-credit model on poor communities, capacity building in larger-scale programs, and equity injection. | Improve access and consumption | This study combined difference-in-difference estimates with propensity score matching. |
| Dwitayanti et al. (2020) [19] | Indonesia/Village Fund (VF) | The impact of VF on the level of community welfare measured by Human Development Index. | Improve the amount of infrastructure and increase community welfare | This study used a simple linear regression analysis using the Statistical Package for Social Sciences (SPSS) program. |
| Ito et al. (2019) [35] | Japan/Direct Payment Scheme (DPS) | The achievement of DPS framework to prevent farmland abandonment in rural areas. | Decrease farmland abandonment | They used propensity score matching to address the non-random community participation in the DPS. Additionally, they used inverse probability weighting and doubly robust estimations to check robustness. They also employed a difference-in-difference approach to improve estimation results of the matching procedure. |
| Kadafi et al. (2020) [20] | Indonesia/Village Fund (VF) | The implication of VF on poverty and literacy rates in underdeveloped villages. | Improve access to education and limited decrease in poverty | In this study, they used a simple linear regression. |
| Labonne (2013) [36] | Philippines/ KALAHI-CIDSS | The impact of the program on access to health and education, poverty, and community empowerment/governance. | Improve access and consumption | This study employed qualitative assessment using focus group discussions and comparison analysis of treatment group and control group. Additionally, parallel trend hypothesis and regression were also used. |

**Table 3.** *Cont.*

| Authorship | Country/Program | Objects Analyzed | Program Contribution | Method Explanation |
| --- | --- | --- | --- | --- |
| Lim et al. (2010) [37] | India/ Janani Suraksha Yojana (JSY) | The impact of JSY to reduce the number of maternal and birth-related deaths. | Improve the number of births in health facilities. | They used data from Indian district-level household surveys to evaluate the effect of JSY. For data analysis, they employed exact-matching analysis, with-versus-without analysis, and the difference-in-difference method. |
| Medonos et al. (2012) [38] | Czech Republic/Rural Development Programme (RDP) | Contributions of investment support for Czech agriculture towards business expansion and productivity improvement. | Improve productivity and business expansion | They used propensity score matching in this study to assess the contribution of the investment support for agriculture. |
| Monsalve et al. (2016) [39] | European Union/European Agricultural Fund for Rural Development (EAFRD) | The sustainability of EAFRD from a triple bottom line perspective. | Improve economy, slightly increase social performance (depending on the labor categories), and increase negative environmental impact | This study employed standard multiregional input-output (MRIO) model to conduct the analysis. |
| Newman et al. (2002) [40] | Bolivia/Social Investment Fund (SIF) | The impact of small-scale rural infrastructure projects in health, water, and education financed by SIF. | Improve access, but limited quality | They used propensity score matching and observing the differences between treatment groups and comparison groups to assess the impact of the program. |
| Nordin and Manevska-Tasevska (2013) [41] | Sweden/Common Agricultural Policy (CAP) | The influence of CAP, comprising grassland subsidy and direct payments, on farm employment. | Improve employment | This study employed comparative analysis based on a fixed effects model and an instrumental variable model. |
| Parajuli et al. (2012) [42] | Nepal/Poverty Alleviation Fund (PAF) | The impact of PAF on rural household welfare: per capita consumption, food insecurity, school enrollment, and child malnutrition. | Improve access to education and consumption | They conducted two rounds of data surveys and a difference-in-difference method combined with the instrumental variable estimation method. |
| Shaaban (2019) [43] | Egypt/Village Savings and Loans Association (VSLA) | The impact of VSLA for women's economic empowerment and social cohesion. | Improve economy and community participation | This study used case studies in seven regions, with data collection conducted via semi-structured interviews with randomly selected samples. |
| Yazid et al. (2019) [18] | Indonesia/Village Fund (VF) | The impact of VF on supporting economic activities and improving the quality of life of village communities. | Decrease poverty | They used qualitative methods and secondary data collected from archival materials, such as scientific journals and government publications. |

As can be seen from Table 3, many studies have analyzed village-related funds in different countries, and each country has its own implementation scheme, such as direct payments [35,37,38,41], loan/credit schemes [23,32,34,43], community driven development programs [29,40,42], and many others. However, none of them evaluated the implementation of those programs with respect to the achievement of SDGs, with some of them focusing only on some specific SDGs, such as infrastructure development and community

welfare [18–21]. For the methodologies used, many prior studies used propensity score matching [23,32–35,38,40], difference-in-difference [21,29,34,35,42], regression [19,20,36], and parallel trend hypothesis [21,29,36] analyses.

## 4. Methodology

### *4.1. Research Design*

This study used both qualitative and quantitative approaches. We used focus group discussions (FGDs) as the primary data source. In addition, we used secondary data from a variety of trusted sources, both public and inaccessible, to assist in the analysis. Figure 1 represents the research framework, describing the methodologies based on analytical aspects and step-by-step objectives, techniques, and expected outcomes.

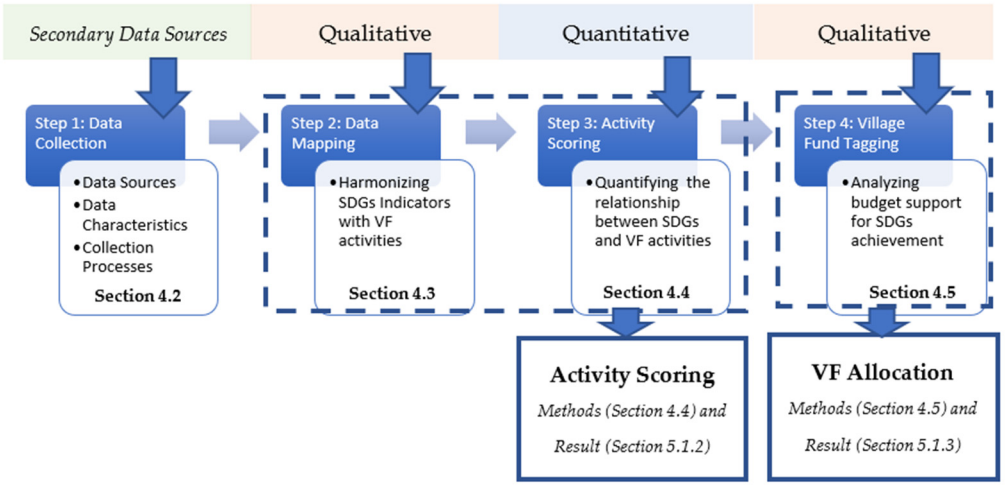



**Figure 1.** Research Design Framework.

The research framework shown in Figure 1 adapts the fundamental framework of measurement to help this study achieve its objective. The fundamental framework of measurement is defined as a direct estimate of an observations that require a concatenation process to equalize the units of measurement [44,45]. In practice, the measurement framework needs to report or achieve its goals by changing certain conditions [46].

Good measurement frameworks should encapsulate five essential components [46]:

1. Objective, defined as a goal of the measurement task or basic question.
2. Condition, defined as a set of circumstances, behaviors or processes that are relevant and necessary to achieve the objective.
3. Theory, a sound underlying theory that supports the credibility of a framework. The theory needs to explain how the condition affects the objective.
4. A state indicator or proxy that helps measure the condition, based on observations that reflect the dynamics of a particular phenomenon.
5. Data, a sufficient amount of qualified observations to reflect the underlying conditions.

These five components formed one of the many types of measurement frameworks used in previous literature [47,48]. Stay [49], Davis [50], and Subiyakto and Ahlan [51] used a much simpler Input-Process-Output Hierarchy (HIPO) was used to illustrate the basic framework of measurement. HIPO is a top-down system design that helps explain the breakdown of activities that need to be undertaken to achieve an objective [50]. HIPO provides a much simpler framework for understanding the measurements made in this study, and while it is of course helpful to explain the logic behind the framework [51], we find little or no use for such frameworks in social science studies. Therefore, inspired by the simplicity that the HIPO framework provided, Figure 2 explains our Fundamental Framework of Measurement.

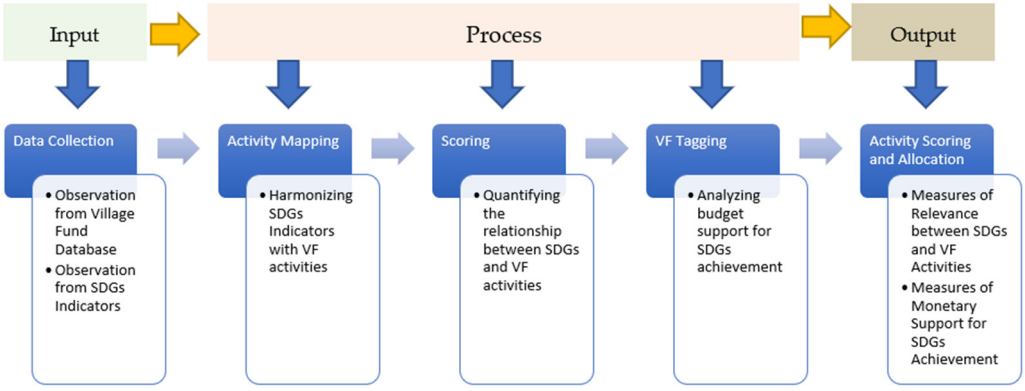



**Figure 2.** Fundamental Framework of Measurement. Framework adopted from [46,50], modified by author.

To understand the fundamental framework of measurement, it is important to first determine the ultimate goal that this study is trying to achieve. As the purpose of this study is to examine the relationship between two different policy areas, the VF program and the achievement of the SDGs, it is important to identify specific inputs and outputs related to achievement of the goals.

In this study, the observations collected from the Village Fund database and the list of SDGs indicators were the inputs needed to create a basic measurement framework. These observations were categorized as "inputs" by the contextual nuances of the activities or policies for both the village fund activities (capturing policy at the village level) and the SDG indicators (capturing policies in the global context). It is important that the inputs have this "common characteristic" to enable this measurement framework to be replicated in other studies.

In addition, the outputs designed as part of the fundamental measurement framework used in this study are the results of measurements of relationships, proxied by the relevance of SDGs and VF activities as well as the budgetary support provided to support villages' SDG achievements. These proxies are set of circumstances that are relevant to achieve the objective of the framework used in this study, which is to examine relationship between two different policies. All SDGs and VF activities set a list of guidelines that policymakers can choose to enact, and it is important to understand how both types of guidelines interact to understand the relationship. Relevance to the objective is an essential requirement for outputs.

The conversion from input to output in the measurement framework requires a process phase. In this study, three components were used to enable such transformations, namely: (i) activity mapping, (ii) scoring, and (iii) Village Fund tagging. The selection of these components must be supported by the underlying theory to support the reliability of the framework. Content analysis was used to theoretically support measurement activities. Content analysis has already been used in the literature and is considered suitable for analysis using qualitative data, as in this study [52–54].

For future replication of the measurement framework described in Figure 2, it is important to adopt a methodological approach with appropriate theoretical support. While content analysis is regarded as a good approach to process observations in the input phase, it is important to recognize that different types of observations in the input phase may require different approaches in the process phase.

To achieve that goal, the measurement framework must not be mutually exclusive. This means that there must be many frameworks that can achieve the same goal. A successful framework needs the ability to influence decision-making. In this study, understanding the research design should enable policy makers to consider how their decision to spend village funds will affect the achievement of SDGs. While it would be ideal to share a similar measurement framework that underlies the study design of this study, there is limited

literature that employs the same approach. This reduces the ability to make comparisons to support the reliability of the new methodology.

### *4.2. Data Collection*

The purpose of the data collection process is to gather the necessary data that will be used for conducting analysis. Table 4 describes the data used in this study.

**Table 4.** List of Datasets and their Characteristics.

| No | Name (Measurement Unit) | Description | Period | Sources |
|---|---|---|---|---|
| 1 | Village Fund Activities Program (Activity Codes) | The list of all programs activities that can be financed by village funds | 2018, 2019, 2020 | OMSPAN (Treasury and Budget Online Monitoring System), |
| 2 | Sustainable Development Goals Indicators (Indicators) | The list of 231 unique global indicators of the framework for the SDGs | 2020 | United Nations [55] |
| 3 | Village Fund Realization (Measured in IDR) | The realization of village funds by each village in Indonesia, classified by villages, VF activities, and Fiscal Year | 2018, 2019, 2020 | OMSPAN |

Note: OMSPAN Database is not publicly accessible, compiled by Directorate General of Information System and Treasury Technology, Indonesia Ministry of Finance.

According to Table 4, there were three main sets of data that were collected and utilized to support this research. The first dataset was the village fund activities program. We collected this data set by sending a request to the Directorate General of Information System and Treasury Technology (SITP Unit) of the Ministry of Finance. This unit plays an important role in the capture and storage of Ministry of Finance-authorized transactions, along with other functions such as the design of structured information system for other treasury activities. These transactions are stored in OMSPAN (Online Treasury and Budget Monitoring System)—an official application to monitor all government budget transactions.

Village fund usage is also recorded in this database as an integral part of the transfer from the central government to the local government. In practice, the SITP Unit has to comply with various Ministerial regulations, of which an important role in the recording of activities is the Ministry of Home Affairs Regulation No. 20/2018 that regulates the classification of village fund activities. These data consist of a list of the activities registered by each village, and this regulation establishes the list of those activities that are assigned with unique codes. As these unique codes were established in 2018, this study used VF data from the 2018–2020 period. Previously, the village activity codes were different among villages and regions, which rendered it impossible to compile and analyze the VF data for the periods before 2018. The number of village activity codes recorded was 250 codes in 2018, and 221 codes both in 2019 and 2020.

The other dataset is the SDG indicators (the second dataset in Table 4). The dataset consists of a list of indicators developed by the Inter-Agency and Expert Group on SDG Indicators (IAEG-SDGs), agreed upon at the 48th session of the United Nations Statistical Commission [56]. The indicators were routinely revised and refined as required by the UN Resolution. These revisions might alter the indicator lists in the global indicator framework. In order to avoid inconsistencies and outdated relevance for this study, we referred to the latest indicator revision in March 2020 [56]. The official SDG indicators have gone through several amendments and refinements. In this study, we utilized the indicators included in the A/RES/71/313, the refinements agreed by the Statistical Commission at its 49th session in March 2018 (E/CN.3/2018/2, Annex II) and 50th session in March 2019 (E/CN.3/2019/2, Annex II), changes from the 2020 Comprehensive Review (E/CN.3/2020/2, Annex II), and refinements (E/CN.3/2020/2, Annex III) from the 51st session in March 2020). Despite routine reviews and potential changes, the number of indicators remained constant.

After compiling the first and second data sets, we composed a list of both the SDG indicators and the village fund activity codes as well as VF realization measured in monetary units. These data sets were then further analyzed to assist understanding the relationships between village funds and SDGs.

### *4.3. Data Mapping*

In the second step, the categorization of the SDGs was matched with the VF program activities (activity code). The purpose of this stage was to map two collected data sets, the SDG indicators and the VF Activity codes. The SDG indicators were used as a guideline to analyze whether the VF was used to fund activities and efforts that support and are aligned with the SDGs. Using content analysis, we identified the linkages between the given SDG indicators and the VF activities. According to Neuman [54], content analysis is a technique to capture and analyze the content of particular documents. Content refers to words, meanings, pictures, symbols, ideas, themes, or messages that can be communicated. Content analysis is a research method that aims to provide an objective, systematic and quantitative description of the content of communications [57].

The correspondence between SDGs and VF activities is an essential contribution of this paper, as it has never been mapped in prior studies. Content analysis was conducted by understanding the activities and matching the meaning of the words in the description of the VF activities with the SDG targets and indicators. The research team conducted cross-testing and analyses, strengthening arguments and minimizing subjectivity. In this way we could depict how each SDG indicator related to VF activities.

### *4.4. Activity Scoring*

As mentioned in the previous section, we utilized content analysis to link the VF programs with the SDG indicators. However, we did recognize possible differences between researchers when analyzing similar activity codes. Such differences, while increasing the variety of findings, might lead to inconsistencies in the presentation of the results.

Therefore, we developed the activity scoring methodology with reference to the conceptual approach of Schutz [52]. This score is intended to explain the relationship (alignment) between two observed categories, which can be representative, but also to minimize inconsistencies when conducting content analysis. The content analysis was carried out by a team of ten researchers in order to reduce biases and minimize different interpretations. Shapiro [58] explained that humans have interpretive abilities that enable them to capture shortcomings observed in the phenomena of interest, which in this case were the lists of SDGs and VF activities. Each researcher acts as a "coder", a term used by Krippendorff [53], to acknowledge efforts to minimize the use of subjective judgment in content analysis.

As part of the analysis, each researcher was asked to learn each SDG indicator and the list of VF activities to understand the types of programs. The latter list was referred to as the "activity code", as it was also used to track spending based on activities, and would be beneficial to the next stage of the research framework. Using this activity code as the reference point, the researchers were asked to map the appropriate indicators and rank them from the most appropriate (strong relationship between VF activities and SDGs achievement) to the least appropriate. Schutz [52] and Krippendorff [53] show that a human is unable to classify more than 6–8 categories (rule of thumb of categorization).

In this study, researchers/coders were presented with a number of SDG indicators that acted as a list of categories that needed to match with each VF activity. This condition required us to rely on the judgment of the researchers based on their experience, which is reflected in their academic backgrounds, research experience, and familiarity with the concept of SDGs gained from training and other experiences. The researchers were also asked not to include any code that seemed irrelevant to the SDGs. Data were subsequently compiled taking into account the following considerations derived from Schultz [52,59] and Krippendorff [53]:

1. Rank to determine type of direct and indirect indicator. The indicator found in the first rank in a budget code was designated as direct relationship indicator, whereas the indicators in second and third rank were assumed to be indirect. This approach helped in organizing complex judgment and avoid confusion. We limited this level to three possible ranks.
2. "The most chosen" rule to determine a direct relationship. If there were multiple indicators ranked by all researchers (for example, indicators 16.1, 14.1, and 11.1 in the first rank for Budget Code 210101), the indicator that most researchers ranked first would be chosen. A similar approach was used to determine the second and third place scores. The indicator chosen by a small number of researchers was ranked second or third only when there was no consensus among the majority of researchers on the placement of an indicator in the second or third place. This approach considered the statistical effects of rates and probabilities that each researcher could consider in his/her decision when classifying the relationship in the previous step.
3. Compatibility Score. The compatibility score reflects the overall strength of the relationship between the budget code and specific SDGs. The score shows how well each indicator is supported by the first, second and third ranked of budget codes. We used the following formula to construct the score for each SDG indicator:

$$(0.5 \times X1) + (0.25 \times X2) + (0.25 \times X3) \quad (2)$$

where X1, X2, and X3 represent the sum of budget codes to which indicator X is assigned in the first, second and third rank, respectively. The weighted score for each rank represents the importance of the direct and indirect relationship; a higher overall score indicates a stronger relationship between SDGs and VF activities. Assigning weighted scores with the aforementioned formula helps treat relationships differently depending on rank order. Note that weighting the first rank more strongly (0.5) than the second and third ranks (each 0.25) and assigning second and third ranks the same weight of 0.25 reflect this study's intention to explain the relationship into dichotomous categories in order to be in line with the framework of Schultz [52]).

This process enabled us to show a more tangible relationship between SDG indicators and VF activities as reflected in the activity code. While the previous section helped us map this relationship, this stage helped us quantify the amount of support that the VF could provide to achieve the SDGs.

Content analysis is subject to the possible differences that may emerge between analysts, in this case the researchers. The aforementioned ranking procedures, in particular "the most chosen" rule, is intended to help resolve differences that researchers may encounter when rating scores. This approach is comparable to a "crowdsourcing" approach, in which data is aggregated in such a way that the most frequent responses reflect the correct and commonly agreed-upon responses [60].

While this approach may raise questions regarding the reliability of the results, as it neglects the diversity of researchers [61], this concern has been addressed by selecting experienced researchers who well understand the issues of SDGs. Pilot testing of this approach was carried out before the actual research took place. In the pilot test, we asked researchers to rate VF activities that were directly related to SDG 7. The choice of SDG 7 was made randomly as the pilot test was not only conducted to inform researchers of the mechanism used to determine the relationship between VF and SDG indicators, but also to avoid misunderstandings when the actual assessment was carried out.

### *4.5. Village Fund Tagging*

As mentioned in the previous sections, we utilized content analysis to map and quantify the relationship between VF programs and the SDG indicators. Aside from these measures, we also used the results obtained in the previous sections as a framework to understand the preferences of local leaders in directing development in their chartered

regions. Based on these data, this study determined to what extent each SDG indicator was financially supported by the VF.

While it is essential to use more detailed SDG indicators to map and assess activities, this study aimed to present the macro level of how the allocation of village funds by individual village leaders supported the achievement of SDGs. Therefore, the outcome of this phase represented the allocation of the VF based on the linked SDGs, reflecting the monetary support that all villages contributed toward the achievement of certain goals.

The existing OMSPAN dataset links VF activity codes to VF realization each year. It is important to note that this study obtained the budget reports for VF with recorded completion of up to 100% for the fiscal year 2018 and 2019 (FY) and 89.1% for FY 2020 as of 18th August 2021. While FY 2020 did not possess complete realization data, we believe that adding the remaining transactions would not significantly change the overall results, given the relatively small percentage of unreported VF realization.

## 5. Results

After conducting content analysis, this study analyzed the mapping of VF activities with respect to each priority issue in SDGs, and the VF composition.

### *5.1. Village Fund Activities*

Table 5 shows VF activities that supported SDGs, grouped according to each goal.

**Table 5.** Village Fund Activities that Supported SDGs.

| SDG | Description | Activities |
|---|---|---|
| Goal 1 | No Poverty | - Facilitating Land Certification for Poor Communities (land ownership)<br>- Village poverty mapping and analysis<br>- Legal aid for village officers and poor communities |
| Goal 2 | Zero Hunger | - Providing agricultural seeds and livestock for communities/institutions<br>- Training on the utilization of local natural resources and agricultural cultivation<br>- Development/improvement of irrigation channels/networks and agricultural businesses<br>- Eradication of pests in agriculture and livestock<br>- Construction of simple irrigation channels<br>- Increasing the number of agricultural and livestock production and processing tools<br>- Maintenance of village-owned barns/granaries and irrigation channels<br>- Other agricultural and livestock activities |
| Goal 3 | Good Health and Well-being | - Implementation of *Pos Kesehatan Desa* and other village-owned health posts<br>- Provision of medicines, village nurses, family planning services, village ambulances, etc.<br>- Other responsive health facilities<br>- Guidance and supervision of traditional health services<br>- Maintenance of health service facilities and equipment<br>- Construction/improvement/repair of village health facilities and infrastructure<br>- Provision of assistive tools for the disabled<br>- The operationalization of Posyandu (health services)<br>- Health education and training<br>- Development of *Palang Merah Remaja* (Youth Red Cross) at the village level<br>- Other health assistance |
| Goal 4 | Quality Education | - Maintenance of village-owned non-formal educational facilities and infrastructure<br>- Providing support for early childhood education, counseling support, and other education<br>- Construction/repair/improvement of educational facilities and infrastructure<br>- Provision of textbooks, art equipment, and other educational teaching aids<br>- Construction/improvement/maintenance of libraries, art studios, and other learning centers<br>- Educational support for poor/outstanding students (via scholarship awards)<br>- Training for the disabled<br>- Management training for village-owned enterprises<br>- Development and maintenance of village-owned training centers<br>- Various youth training at the village level<br>- Other formal and non-formal education and training activities |

**Table 5.** *Cont.*

| SDG | Description | Activities |
|---|---|---|
| Goal 5 | Gender Equality | - Organizing women's empowerment activities and child protection<br>- Women's empowerment training/counseling<br>- Other activities in the sub-sector of women's empowerment and child protection |
| Goal 6 | Clean Water and Sanitation | - Maintenance of water sources and infiltration wells<br>- Maintenance of clean water sources (springs, rainwater, drilling wells, etc.)<br>- Development/repair/improvement of infiltration wells and clean water sources<br>- Construction/repair/improvement of clean water connections to households<br>- Construction/repair/improvement/maintenance of household sanitation and public toilet facilities |
| Goal 7 | Affordable and Clean Energy | - Provision/maintenance of village street lighting, village-scale power plants, and electricity distribution networks<br>- Maintenance of alternative energy facilities and infrastructure at the village level |
| Goal 8 | Decent Work and Economic Growth | - Providing fixed income and allowances for Village Head and other village officers<br>- Management training for small-scale enterprises<br>- Providing appropriate technologies for village economic development<br>- Establishment and management of village-owned enterprises<br>- Maintenance of village-owned enterprises' facilities and infrastructure<br>- Development of small industries at the village level<br>- Maintenance and development of village-owned tourism facilities and infrastructure<br>- Other activities related to public works and spatial planning, trade, and industrial activities |
| Goal 9 | Industry, Innovation, and Infrastructure | - Development/repair/improvement/maintenance of bridges<br>- Construction/repair/improvement of village office buildings/infrastructure<br>- Provision of facilities (fixed assets) for government offices<br>- Maintenance of village office buildings/infrastructure<br>- Development/maintenance of village markets<br>- Development/repair/improvement of facilities and infrastructure for village community training<br>- Maintenance of village-owned enterprises' facilities and infrastructure<br>- Development/maintenance of village-owned warehouses, lodging houses, and storage areas<br>- Provision/maintenance/management of village-owned transportation facilities<br>- Development/maintenance of village tourism and sports facilities<br>- Maintenance of village roads, village street signs, and terminals<br>- Development/improvement of village-owned cultural religious facilities and infrastructure<br>- Training and development of the Village Information System |
| Goal 10 | Reduced Inequalities | - Organizing women's empowerment activities and child protection<br>- General administration services and population registration<br>- Providing fixed income and allowances for village officers<br>- Coordination/cooperation with government administration in village development<br>- Other activities related to investment support |
| Goal 11 | Sustainable Cities and Communities | - Organizing inter-regional village competitions<br>- Conducting and organizing religious ceremonies<br>- Providing equipment for village-scale disaster preparedness<br>- Providing youth and sports facilities and infrastructure<br>- Maintenance of cemeteries/historic sites<br>- Development/repair/improvement of waste management facilities<br>- Construction/repair/improvement of village offices infrastructure and facilities<br>- Development/maintenance of village-scale power plants<br>- Organizing activities related to operations of small and medium-sized enterprises<br>- Land acquisition for village development<br>- Land and Building Tax Administration (PBB)<br>- Organizing land administration/registration and mediation of conflicts related to land |

**Table 5.** *Cont.*

| SDG | Description | Activities |
|---|---|---|
| Goal 12 | Responsible Consumption and Production | - Implementation of operations of village-level waste management<br>- Maintenance of wastewater disposal systems<br>- Development/repair/improvement of wastewater disposal systems<br>- Development/maintenance of fishing boats and fish auction points |
| Goal 13 | Climate Action | - Organizing training on village-scale disaster preparedness/alertness<br>- Construction/development of village-scale disaster preparedness posts |
| Goal 14 | Life Below Water | - Maintenance of inland fishery ponds and river/small fishing ports<br>- Provision of various fishery assistance (seeds, feed, etc)<br>- Protection of coral reefs<br>- Other marine and fishery activities |
| Goal 15 | Life on Land | - Training/counseling related to the land sector<br>- Determination of/affirmation of/development of signs for village boundaries<br>- Forest management, village greening, and other environmental management<br>- Organizing plant protection facilities (agricultural insurance, plant control infrastructure) |
| Goal 16 | Peace, Justice, and Strong Institutions | - Provision of village government operational needs (stationery, equipment, staff salaries, electricity/telephone, etc.)<br>- General administration services and population registration (identity cards, birth certificates, etc.)<br>- Preparation of village planning, financial documents, and Village Government Reports<br>- Performance Evaluation of Village Governments<br>- Construction/implementation of village security posts<br>- Training and increasing the capacity of security personnel |
| Goal 17 | Partnership for The Goals | - Implementation of population administration, civil registration, statistics, and archives<br>- Activities related to preparation/updates of village regional and social maps<br>- Preparation of village spatial planning documents<br>- Administration and management of tax collection |

### *5.2. Village Fund SDG-Related Activities Scoring*

This section presents the results of the relevance scoring of VF activities with the SDGs, as explained in Section 4.4.

Table 6 shows that SDG 9 had the highest relevance score, while SDG 4 followed close behind and SDG 11 after that. The higher the relevance score, the more effective the activities were in achieving the intended goals. SDG 5, SDG 10, SDG 12, and SDG 17 had the lowest score, which means that the activities conducted related to these SDGs were less relevant to the achievement of these SDGs.

**Table 6.** Village Fund SDG Activities Scoring.

| SDGs | Main | | Score | |
|---|---|---|---|---|
| | 2018 | 2019 and 2020 | 2018 | 2019 and 2020 |
| 1 | 5 | 5 | 4.75 | 4.50 |
| 2 | 9 | 8 | 5.75 | 5.00 |
| 3 | 13 | 13 | 13.25 | 13.25 |
| 4 | 44 | 44 | 28.50 | 27.50 |
| 5 | 0 | 0 | 0.25 | 0.25 |
| 6 | 22 | 18 | 16.25 | 13.00 |
| 7 | 3 | 3 | 1.50 | 1.50 |
| 8 | 25 | 16 | 16.00 | 11.50 |
| 9 | 42 | 33 | 37.00 | 31.00 |
| 10 | 0 | 0 | 1.00 | 0 |
| 11 | 32 | 27 | 22.50 | 19.00 |

**Table 6.** *Cont.*

| SDGs | Main | | Score | |
|---|---|---|---|---|
| | 2018 | 2019 and 2020 | 2018 | 2019 and 2020 |
| 12 | 0 | 0 | 3.75 | 3.75 |
| 13 | 2 | 2 | 2.50 | 2.50 |
| 14 | 11 | 7 | 7.00 | 5.00 |
| 15 | 10 | 9 | 5.25 | 5.25 |
| 16 | 27 | 27 | 15.25 | 15.25 |
| 17 | 0 | 0 | 0 | 0 |

Note: 2019 and 2020 had similar village fund activities (explained in Section 4).

### 5.3. Village Fund Allocations

This section compares VF allocations in 2018–2020 classified by each SDG and sorted from the highest total allocation.

From Tables 7 and 8 as well as Figure 3, SDG 9 had the highest VF allocation in 2018 and 2019 with the total allocation reaching IDR31.38 trillion (54.33%) in 2018 and IDR36.2 trillion (54.24%) in 2019, as well as the second-highest allocation in 2020 with IDR16.11 trillion (25.81%). This may relate to the fact that the focus of the GoI is infrastructure development [62]. SDG 11 had the second-highest allocation in 2018 and 2019 with IDR5.34 trillion (9.24%) and IDR6.6 trillion (9.89%), respectively, as well as the highest allocation in 2020 with IDR28.51 trillion (45.69%). This SDG has a quite high VF allocation each year because sustainable community development, which is defined as an effort to find balance among economic, community, and ecological development, is crucial to improving the quality of life within communities [63]. SDG 6 had the third-highest allocation in 2018 with IDR5.08 trillion (8.80%), fourth-highest allocation in 2019 with IDR5.8 trillion (8.69%), and fifth-highest allocation in 2020 with IDR2.79 trillion (4.47%). This may indicate that regional governments tried to increase the water and sanitation infrastructure in their regions to achieve SDG 6. This is related to the consideration that poor water, sanitation, and hygiene are major contributors to diarrheal disease and preventable child deaths, accounting for at least 600,000 deaths of children under 5 years annually [64]. Globally, an estimated 673 million people still defecate in the open. Indonesia ranks third in the world, with over 25 million people not using sanitation facilities [65].

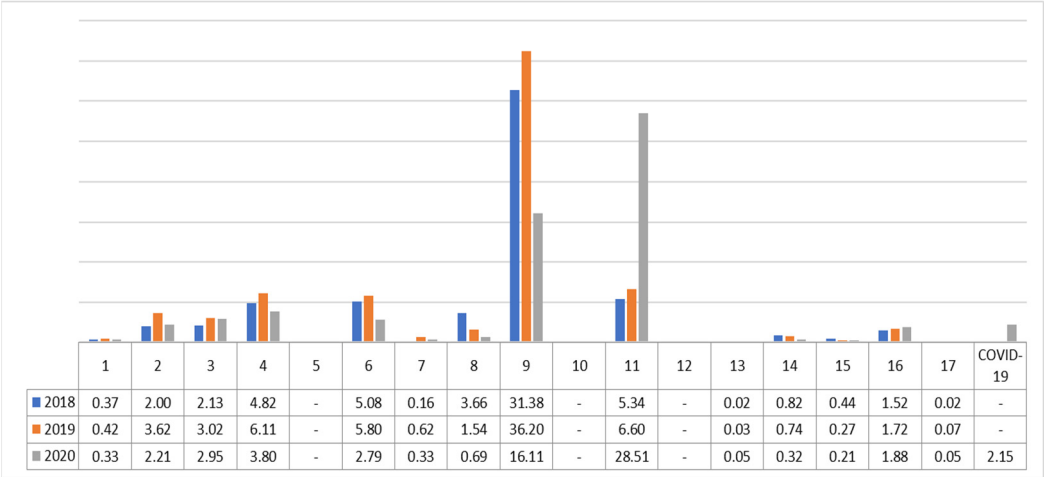
**Table 7.** Village Fund SDG Allocations in 2018 and 2019.

| 2018 | | | 2019 | | |
|---|---|---|---|---|---|
| SDGs | IDR | % | SDGs | IDR | % |
| 9 | 31,384,412,923,921 | 54.33% | 9 | 36,201,180,508,977 | 54.24% |
| 11 | 5,340,340,749,691 | 9.24% | 11 | 6,599,482,208,255 | 9.89% |
| 6 | 5,080,924,032,220 | 8.80% | 4 | 6,108,367,243,623 | 9.15% |
| 4 | 4,817,363,906,321 | 8.34% | 6 | 5,799,944,410,121 | 8.69% |
| 8 | 3,658,809,730,389 | 6.33% | 2 | 3,618,742,718,691 | 5.42% |
| 3 | 2,130,551,620,897 | 3.69% | 3 | 3,017,373,458,082 | 4.52% |
| 2 | 1,996,098,399,921 | 3.46% | 16 | 1,717,734,470,167 | 2.57% |
| 16 | 1,520,080,767,426 | 2.63% | 8 | 1,544,220,147,962 | 2.31% |
| 14 | 821,999,106,074 | 1.42% | 14 | 742,414,240,826 | 1.11% |
| 15 | 444,157,836,090 | 0.77% | 7 | 620,569,890,707 | 0.93% |
| 1 | 370,617,622,561 | 0.64% | 1 | 417,308,508,210 | 0.63% |
| 7 | 160,227,575,188 | 0.28% | 15 | 270,109,622,410 | 0.40% |
| 17 | 22,629,260,778 | 0.04% | 17 | 65,532,829,025 | 0.10% |
| 13 | 22,225,284,095 | 0.04% | 13 | 25,559,265,952 | 0.04% |
| 5 | 0 | 0.00% | 5 | 0 | 0.00% |
| 10 | 0 | 0.00% | 10 | 0 | 0.00% |
| 12 | 0 | 0.00% | 12 | 0 | 0.00% |

**Table 8.** Village Fund SDG Allocations in 2020.

| SDGs | 2020 (IDR) | 2020 (%) |
|---|---|---|
| 11 | 28,513,917,628,198 | 45.69% |
| 9 | 16,106,214,685,063 | 25.81% |
| 4 | 3,804,633,956,704 | 6.10% |
| 3 | 2,953,373,790,597 | 4.73% |
| 6 | 2,790,068,342,931 | 4.47% |
| 2 | 2,214,204,702,768 | 3.55% |
| COVID-19 [1] | 2,150,742,108,462 | 3.45% |
| 16 | 1,884,848,078,082 | 3.02% |
| 8 | 689,248,464,547 | 1.10% |
| 7 | 329,330,410,759 | 0.53% |
| 1 | 327,073,717,071 | 0.52% |
| 14 | 324,190,881,213 | 0.52% |
| 15 | 212,985,857,179 | 0.34% |
| 13 | 54,955,549,367 | 0.09% |
| 17 | 53,915,592,627 | 0.09% |
| 5 | 0 | 0.00% |
| 10 | 0 | 0.00% |
| 12 | 0 | 0.00% |

[1] There were seven new codes specifically designated for COVID-19 relief programs. The village fund was used as one of the instruments for COVID-19 economic aid for villagers in 2020. The currency rate of IDR per 1 USD is 14,300 (as of 6 November 2021).



| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | COVID-19 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2018 | 0.37 | 2.00 | 2.13 | 4.82 | - | 5.08 | 0.16 | 3.66 | 31.38 | - | 5.34 | - | 0.02 | 0.82 | 0.44 | 1.52 | 0.02 | - |
| 2019 | 0.42 | 3.62 | 3.02 | 6.11 | - | 5.80 | 0.62 | 1.54 | 36.20 | - | 6.60 | - | 0.03 | 0.74 | 0.27 | 1.72 | 0.07 | - |
| 2020 | 0.33 | 2.21 | 2.95 | 3.80 | - | 2.79 | 0.33 | 0.69 | 16.11 | - | 28.51 | - | 0.05 | 0.32 | 0.21 | 1.88 | 0.05 | 2.15 |

**Figure 3.** Village Fund SDG Allocations Comparison in 2018–2020 (in trillions IDR). Note: Numbers 1–17 indicate the SDG numbers.

SDG 4 had the fourth-highest allocation in 2018 with IDR4.82 trillion (8.34%), third-highest allocation in 2019 with IDR6.11 trillion (9.15%), and third-highest allocation in 2020 with IDR3.8 trillion (6.10%). This might reflect an increased effort from the government to develop the country's education system, which would determine its future progress [66]. SDG 8 had the fifth-highest allocation in 2018 with IDR3.66 trillion (6.33%), and its allocation decreased in 2019 and 2020 with total allocations of IDR1.54 trillion (2.31%) and IDR689.25 billion (1.10%), respectively. Unfortunately, we could not determine any specific reason that caused this significant reduction in the allocation for SDG 8. The last one was SDG 2 with an allocation of IDR2 trillion (3.46%) in 2018, ranked seventh, ranked fifth in 2019 with IDR3.62 trillion (5.42%), and ranked sixth in 2020 with IDR2.21 trillion (3.55%). This increase might show that village governments' efforts to ensure food security in villages is crucial to improving the welfare of many village populations. These allocations will be discussed further in Section 6.1.

One of the SDGs that had the lowest allocation was SDG 15 with IDR444.16 billion (0.77%) in 2018, IDR270.11 billion (0.40%) in 2019 and IDR212.99 billion (0.34%), in which the villages' activities related to SDG 15 mostly involved arrangement and regulation of land ownership/registration as well as land use for facilities construction. Another SDG with low allocation was SDG 1 with IDR370.62 billion (0.64%) in 2018, IDR417.31 billion (0.63%) in 2019, and IDR327.07 billion (0.52%) in 2020. The government should have focused more on SDG 1, considering poverty is still a problem in Indonesia, where a significant gap between the rich and the poor still exists [67]. Next was SDG 7 with IDR160.23 billion (0.28%) in 2018, IDR620.57 billion (0.93%) in 2019, and IDR329.33 billion (0.53%) in 2020. The allocation for this SDG can be said to be too low, considering there are some areas in Indonesia that do not have access to electricity, especially villages in Papua. The allocation for SDG 17 in 2018 was IDR22.63 billion (0.04%), IDR65.53 billion (0.10%) in 2019, and IDR53.92 billion (0.09%) in 2020, which was the lowest in that year. The objectives of SDG 17 could be said to be irrelevant for village governments, pertaining more to the national government, so this is not surprising. The last was SDG 13 with an allocation of IDR22.23 billion (0.04%) in 2018, IDR25.56 billion (0.04%) in 2019, and IDR54.96 billion (0.09%) in 2020. This might show that the government still has not paid enough attention to climate change issues and needs to optimize its objectives.

It can also be seen that allocations were not made across all the SDGs. Three SDGs had no allocation at all, which were SDG 5, SDG 10, and SDG 12. The analysis of these SDGs with respect to the VF will be described in Section 6.3.

The Sustainable Development Report [68] presents a global assessment of countries' progress toward the achievement of SDGs. Indonesia is ranked 101st of 166 countries in the SDG Global rank, with an index score of 65.3 and a regional average score of 67.2. Based on "Sustainable Development Report 2020" [68] (page 256) that shows Indonesia's national average SDG performance, SDG 13 had the highest average performance with a rate of approximately 90%, followed by SDG 4 and SDG 12 at approximately 85%. On the other hand, SDG 9 and SDG 10 had the lowest performance achievement, at a rate below 50%.

It must be noted that this average performance is of the whole country, where the VF is only one of the many contributing factors to progress in SDG achievement. Even so, if we consider this performance report, it could be one of the key factors in the budget decisions. SDG 9 shows one of the lowest achievements of progress; therefore, the GoI might need to pay more attention to this aspect, hence its high budget allocation and prioritization in the development plan. However, SDG 10 also had a low performance rate, but the VF allocation for this aspect was neglected (discussed in Section 6.3).

## 6. Discussion

### *6.1. SDGs with the Highest Allocation*

The five SDGs with the highest allocation in 2018 were, sequentially, SDGs 9, 11, 6, 4, and 8, while in 2019 were SDGs 9, 11, 4, 6, and 2, and in 2020 were SDGs 11, 9, 4, 3, and 6. SDG 9 received the largest allocation, reaching more than half of the total fund, especially in 2018 and 2019. This is in agreement with prior studies by Yazid et al. [18], Kadafi et al. [20], and Dwitayanti et al. [19] which all found that the VF tended to be used for facility and infrastructure development. The focus of the VF for infrastructure is based on the President of Indonesia's decision, which must be complied with by the Ministry of Villages [69]. This is because infrastructure development in many regions, funded by the VF distributed to 74,900 villages, is the key to economic equality and poverty alleviation [62].

Sustainable community development is designed to improve the quality of life within communities with a balance between three areas of the development process: economy, community, and ecology [63]. The fulfillment of SDG 11 is substantial for the development and welfare of villages and had the highest allocation in 2020 and the second-highest allocation in 2018 and 2019. The allocation amount also increased each year, with an increase of IDR1.26 trillion (23.58%) from 2018 to 2019 and IDR21.91 trillion (332.06%) from 2019 to 2020.

A study by Nalle and Syaputri [70] stated that data from the Ministry of Public Works and People's Housing in 2017 showed that only 34 of 541 cities in Indonesia had regional regulations on sanitation. The VF allocation of SDG 6 increased by IDR719.02 billion (14.15%) from 2018 to 2019 and decreased by IDR3.01 trillion (51.89%) from 2019 and 2020. Even with the decrease in 2020, the total allocation for this SDG is still high, which could mean that this is one of the ways that local governments increased the regional sanitation level.

The impact of the quality of education is key to the nation's competitiveness, because education is the main system that can drive change in society [66]. The government's policy in health, education, and social protection might pave the way for today's children to surpass the human-capital achievements and quality of life of the generations that preceded them [71]. Considering the importance of high-quality education, the education quality in Indonesia is considered low, especially in village areas, while the VF allocation to SDG 4-related activities can be considered quite high, as it was the fourth-highest in 2018, third-highest in 2019, and third-highest in 2020. The amount allocated for this SDG increased quite significantly from 2018 to 2019, by IDR1.29 trillion (26.80%), while in 2020 it decreased by IDR2.3 trillion (37.71%). Even though it decreased, the allocation for SDG 4 in 2020 was still high with IDR3.8 trillion. This might show that the government's awareness of the importance of developing high-quality education for their communities also increased. This is also supported by Kadafi et al. [20] who found an increase in literacy rates in disadvantaged villages that received VF.

One of the indicators to assess the achievement of SDG 8 is the unemployment rate, defined as "the number of unemployed people as percent of the labor force, where the labor force includes the people who are either employed or unemployed" [72]. According to the Global Economy [72], Indonesia's unemployment rate from 2018–2020 was 4.4%, 3.62%, and 4.11% respectively. Another indicator is economic growth, which can be assessed through the annual GDP growth percentage. According to the World Bank [71], Indonesia's GDP growth was 5.17% in 2018, 5.025% in 2019, and −2.07% in 2020. Based on these data, it can be said that Indonesia's performance regarding SDG 8 from 2018 to 2020 decreased slightly. The VF allocation for this SDG was the fifth-highest in 2018 and decreased in the following year by IDR2.11 trillion (57.79%), and decreased again in 2020 by IDR854.97 billion (55.37%). It cannot be determined what caused this significant reduction in the allocation for SDG 8. Nevertheless, the VF activities related to SGD 8 were mostly focused on small business development, including management training, development of technologies, and industrial activities at the village level. Regardless, the government must also focus on the quality of employment, whether economic growth can open more job opportunities, and reducing poverty [73] to ensure the achievement of SDG 8. As found by Dwitayanti et al. [19], the VF contributed to an increase in village community welfare; one example was by providing more employment opportunities for the community.

SDG 2 can be achieved through food security. The agricultural sector provides the main livelihood for most village communities. The development of sustainable agriculture may affect economic, social, and environmental aspects that improve the welfare of farmers and their related stakeholders [74]. It is also crucial to formulate policies to support the finances of the agricultural sector and to enhance sustainable use of natural resources, as well as to reduce income disparities with other sectors [75]. Therefore, developing and improving the agricultural sector in villages might help achieve other SDGs. The allocation for SDG 2 was quite high in 2019, when it increased by IDR1.62 trillion (81.29%) compared to 2018, while in 2020 it decreased by IDR1.4 trillion (38.81%). This considerably high allocation might show that the government has become more serious regarding ensuring food security.

### *6.2. SDGs with The Lowest Allocation*

On the other hand, the five SDGs that have the lowest VF allocation in 2018, sorted from highest, were SDGs 15, 1, 7, 17, and 13, while in 2019 were SDG 7, 1, 15, 17, and 13,

and in 2020 were SDG 1, 14, 15, 13, and 17. A study by Sayer et al. [76] pointed out that there will be trade-offs between SDG 15, life on land, and other SDGs. As described earlier, SDG 1 is directly and indirectly related to many other SDGs, including SDG 15. Agriculture is one of the most prominent drivers of deforestation [77] and deforestation could lead to increased carbon emissions that contribute to climate change [78]. It can also be said that development and conservation compete with each other [76], and with development being the top priority for the current GoI, more deforestation and land degradation cannot be avoided. The allocation for SDG 15 was quite low in 2018, with only approximately IDR444.16 billion, and decreased in the following year by IDR174.05 billion (39.19%) as well as in 2020 by IDR57.12 billion (21.15%). Furthermore, villages' activities related to SDG 15 were also mostly involving the regulation of land ownership/registration and land use, not land conservation.

SDG 1, Poverty, also becomes an encumbrance for developing countries regarding their efforts to upgrade their status to that of a developed country. As a developing country with one of the highest population densities in the world, Indonesia has continued to struggle with poverty [79], with approximately 10.14% of Indonesia's population living below the poverty line [8]. The population of poor people is mostly in rural areas, so if the government focused on reducing poverty in villages, the poverty level in the country would generally decrease [80]. Poverty alleviation itself is closely related to other SDGs [67]. Considering the importance of this goal and its connection with other SDGs, the government should have allocated more funds towards the achievement of this goal. Instead, SDG 1 only received a small portion of the VF, with only IDR370.62 billion in 2018, IDR417.31 billion in 2019, and IDR327.07 billion in 2020. This is in line with Kadafi et al. [20], who found a low level of influence on poverty because the VF still tends to be used for development of infrastructure and facilities. In contrast, Yazid et al. [18] stated that the VF had contributed to a decline in the number of poor people in rural areas, from 17.8 million people in 2015 to 15.8 million people in 2018.

The progress on the achievement of SDG 7 has been too slow if the objectives are to be achieved by 2030 [81]. The distribution of electricity and other energy access in developing countries is still uneven in many of its rural areas. The GoI, for the period of 2014–2019, supplied more electricity to support the needs of several areas [80]. President Joko Widodo stated that in 2020, 433 villages still did not have access to electricity [82]. For the allocation, the amount was only IDR160.23 billion in 2018, but there was a significant increase in the following year by IDR460.34 billion (287.31%) and a decrease in 2020 by IDR291.24 billion (46.93%).

To achieve sustainability, a country needs strong commitment and coordination from all of the relevant stakeholders [83] from various levels, including the central government, local government, non-government organizations, local communities, companies, academia, and expert communities [84]. A study by Huang and Quibria [85] found that assistance from other countries had a positive significant influence on the sustainable development of a country. While this showed that SDG 17 is important, the objectives are generally irrelevant for village governments, and one of the main focuses of this goal is for the central government to ensure that the national SDG targets can be adapted and supported by each local government. Hence, considering these aspects of the goal, SDG 17 could not be a priority for village governments. This also showed in the VF allocations, in which only IDR22.63 billion, IDR65.53 billion, and IDR53.92 billion were allocated in 2018–2020, for activities that were mostly related to administration and archiving of villages' documents and data.

Finally, climate change is one of the main threats to Indonesia [86], considering that agriculture and fisheries are the main livelihoods for the majority of villages, and those industries are the most vulnerable to climate change [87]. For carbon emissions, the effect of COVID-19 only appeared in the short term, where Indonesia seemed to miss an opportunity to maximize emissions reduction during the pandemic recovery period. Therefore, the Climate Action Tracker rated Indonesia as "Highly Insufficient" in terms of climate action

efforts and policies [88]. This shows that the GoI has still not prioritized SDG 13, in which it needs to optimize the objectives, as the existing framework does not accommodate a climate action reduction effort. This could also be seen in the VF allocations, in which only IDR22.23 billion, IDR25.56 billion, and IDR54.96 billion were allocated for SDG 13 in 2018–2020, the lowest VF allocations in 2018 and 2019.

### *6.3. Neglected SDG Objectives*

There are also some neglected SDG objectives, namely SDGs 5, 10, and 12, in which there were no allocations for these SDGs from 2018 to 2020. For SDG 5, gender equality, the finding resonates with the study by Widiastuty [89] that described the role of women in occupational activities as still lower than men. In 2018, Indonesia had a Gender Inequality Index (GII) value of 0.451, ranking it 103 out of 162 countries. GII can be interpreted as the loss in human development due to inequality between female and male achievements [90]. Therefore, a comprehensive effort is needed to increase the role of women in development, especially in village development. Women's participation and empowerment are one of the keys to developing inclusive economic growth and employment opportunities [89].

For SDG 10, reduced inequality, the GoI implements an autonomy policy for local governments to manage regional economic growth. The rate of regional economic growth in Indonesia is comparatively different in each region, which results in income inequality. Ideally, high economic growth would show an improved distribution of income in a region [91]. Therefore, local governments—in this case, village governments—should have paid more attention to SDG 10, including by developing an economic development policy that could reduce income inequality.

SDG 12 is said to be the two pillars of sustainable development [92]. Studies by Dubey et al. [93,94] stated that responsible consumption and production could promote "resource and energy optimization, better infrastructure, and access to basic amenities, green environment and decent jobs for everyone". Seeing how crucial this SDG is, it is unfortunate that village governments neglected it, as the achievement of this goal could lead to more sustainable communities in their villages.

### *6.4. Linkages between the Village Fund and Government Priorities/Existing Regulation*

One of the principles in setting the VF priorities is prioritizing the local authority at the village level. This means that the village government is given the independence to determine and allocate the fund to meet the needs of their village. Therefore, each village official should understand their communities' conditions so that the allocation is relevant and could fulfill their priority needs. However, many village leaders do not have sufficient knowledge or awareness related to SDGs.

As stated in The Regulation of Ministry of Villages Number 19/2017 on Priority Use of VF in 2018 (discussed in the literature review), the priorities are for Village Infrastructure, Basic Social Service Infrastructure, Economic and Business Infrastructure, Environmental Conservation Facilities, and other facilities. The priorities mostly focus on developing and providing infrastructure, in which this infrastructure provides services for various fields. These infrastructure developments may provide services for village communities that also contribute to the achievement of other SDGs such as SDG 3, SDG 7, and SDG 13, among others. However, in the activity mapping process, as discussed in Section 4.1, we attributed this type of activity to SDG 9, considering that it contributed to the addition of available infrastructure and facilities in the villages. This might be one of the reasons that caused the extremely high SDG 9 VF allocation, as well as the fact that the President prioritized infrastructure development [62]. For the other SDGs, there are no regulations that specifically state or regulate the utilization of VF to fulfill them. The reason for this is that the condition of each village is different and has its own priorities.

## 7. Conclusions

Based on the analysis of VF activities and allocation related to the SDGs, it can be concluded that VF activities are mostly related to development activities and improving infrastructure. This can be seen from the VF allocation for SDG 9 (industry, innovation, and infrastructure), especially in 2018 and 2019, which was significantly larger compared to the other SDGs, and consumed more than half of the total fund. If we look at total fund allocation, SDG 9 took almost 55% of the total fund, while the second-highest allocation, SDG 11 (sustainable cities & communities), did not even reach 10% of the total fund. This shows that the VF activities were so focused on infrastructure development that they put aside other aspects in villages that were no less important, although which may not be considered appropriate for all villages.

Based on the VF activity mapping process conducted in this study, some SDG targets are neglected. The use of VF is a priority for local authority preferences, and village governments have independence to determine and allocate resources to meet the needs of their villages. However, we found that many village leaders do not have sufficient knowledge/awareness related to SDGs.

The VF is one of the policy instruments that can be utilized to facilitate the achievement of SDGs through appropriate regulation so that the funds can be used to achieve SDG targets. Villages have traditions of encouraging openness, discussion, and participation in the decision-making processes. This tradition is primarily related to the principle of universality of the SDGs, which may serve as a basis for encouraging village governments to include the SDGs in their activities [13]. The collective society in rural communities can also contribute to the successful implementation of sustainability throughout the community. Public participation is an important way to achieve SDGs [95]; hence, the most important step is to bring the value of sustainable communities [96] to rural areas in urgent need of assistance to reach the SDG targets.

The village governments should also consider their villages' environmental and social conditions in composing the budget. These environmental and social conditions have been categorized in the Regulation of The Ministry of Villages Number 2/2016, which divides villages into Independent, Advanced, Developing, Disadvantaged, and Very Disadvantaged Villages. This categorization would help village governments to prioritize issues that are most relevant for their village's economic, environmental, and social conditions. The central government and regulators would have to coordinate with the village government to create regulations that support the development and welfare of villages, and the achievement of SDGs through the utilization of the VF.

Indonesia developed its own Village SDGs, which combine the global SDGs and Indonesia's national sustainable development targets, localized to adapt to local culture as well as social and environmental conditions and with an additional 18th goal, which is "Dynamic village institutions and adaptive rural culture" which basically states that village development must be based on the local culture of each village. These Village SDGs would be effective as they could increase the likelihood of the achievement of national sustainable development goals by 74% [15]. Therefore, it is recommended that other developing countries formulate similar strategies to help achieve their national SDG targets and to develop rural areas in a more targeted way by prioritizing the most relevant issues. Several aspects, such as the rural culture, social conditions, and environmental conditions, need to be taken into consideration in adapting this approach.

In sum, this study offers policy insights and practical implications for rural development policy globally. The Indonesian experience in the last five years, managing 70,000 autonomous villages that spent an enormous public budget, is remarkable. Furthermore, the Indonesian monitoring system is in place in the rural development program to measure SDG achievement at the village level. Based on Indonesia's lesson, we learned that to achieve SDGs effectively within a country, the programs, and budgets of the central, regional, district, and village governments must be aligned. A harmonized system between national goals and SDGs in program planning and implementation is needed to improve

accountability in SDG achievement reporting. A tracking system based on each goal indicator in sustainable development is helpful to quantify the amount of resources disbursed at all levels of government entities.

Based on our employed methodology, we found that we could "bridge the knowledge gap" regarding the relationship between the VF and SDGs. Our methodology enabled us to map SDG achievement at the lowest level of government, which is the village, and track the realization of VF programs through the implementation of VF-related activities at the village level. Our study also provided a new perspective in assessing the effectiveness of VF through a measurement tool with clear and targeted goals, that is, the SDGs. Through SDGs, we could also establish a measuring instrument to compare/adjust the performance of villages globally in achieving sustainable development.

However, the results of this study should be considered in the context of some limitations. The data collected were limited to the village leaders' reports generated by OMSPAN. It was also prone to subjectivity of village leaders in choosing particular programs that they believed to be beneficial for their villages. The methodology used for activity scoring may also possess unavoidable human inaccuracy in the judgment process, as researchers were asked to correlate approximately 231 SDG indicators to specific VF activities. Schutz [52] and Krippendorff [53] have previously showed that humans may not be able to classify more than 6–8 categories; therefore, it is advisable for future studies that this issue is addressed.

It is also suggested that future researchers analyze reported data over a longer period. As the study of SDGs is considered very limited, more research from other countries committed to SDGs is encouraged. This type of study is important in building a competitive advantage among countries, so that they can be motivated to support SDGs with real contribution and value to their communities. An understanding must be developed that achieving SDGs is not only beneficial to the current generation, but also important for creating a better future for the next generation.

For future studies aimed at applying this methodology, there are several other limitations that need to be addressed. The most important of these is standardized input. In Indonesia, these observations have been available since 2018, whereas prior to that year the Indonesian database of VF activities had not been standardized, making it impossible to employ the proposed methodology. Another aspect to consider is subjectivity when performing content analysis. This can distort the results obtained if the researchers do not have similar perspectives on the issues being analyzed. The robustness of this new methodology needs to be further evaluated for future studies, as no similar literature is currently available to compare and to contrast with previous studies. The strong point of this study is its use of population data; however, to improve the validity and reliability of the data in future studies, these data should also be supplemented by primary data collection and field studies.

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