



## VILLAGE FUND REFORM: A PROPOSAL FOR MORE EQUITABLE ALLOCATION FORMULA

M. Olgiano Paellorisky<sup>1</sup>, Akhmad Solikin<sup>2,\*</sup>

<sup>1</sup>Fiscal Policy Agency, Ministry of Finance of the Republic of Indonesia  
Jl. Dr. Wahidin Sudirohusodo, No. 01, Ps. Baru, Sawah Besar, Jakarta Pusat, Jakarta 10710, Indonesia

<sup>2</sup>Polytechnic of State Finance STAN  
Jl. Bintaro Utama Sektor V, Bintaro Jaya, Tangerang Selatan, Banten 15222, Indonesia

Received: 15 August 2018; Accepted: 27 March 2019; Published online: 31 May 2019

DOI: 10.21787/jbp.11.2019.1-13

### Abstract

The allocation of Village Fund as stipulated in the Minister of Finance Regulation number 49/PMK.07/2016, i.e. basic allocation (*alokasi dasar*) 90% and formula allocation (*alokasi formula*) 10%, could be considered as unequal because of poor attention to the indicators of poverty and development of each village. Basic allocation relates to the same amount of allocation per village, while formula allocation refers to an allocation based on the number of populations in poverty, size of area, and infrastructure price index. This article aims to investigate the ideal allocation proportion of village funds. Methods used in this study were a correlation and the analytical hierarchy process. The results show a stronger correlation between village fund and poverty and development indicators if more money is allocated in the formula allocation. However, an inequality of allocation ratio and larger fund are needed to achieve the program's targets. Based on the weighted value of the expert group perception, the proposed formula for the ratio of basic allocation (*alokasi dasar*) and formula allocation (*alokasi formula*) is 10:90. With this formula, it is expected that poverty and development can be more quickly resolved. So, the purpose of the Village Fund as mandated by Law Number 6/2014 could be achieved.

**Keywords:** Analytical Hierarchy Process, Justice as Fairness, Village Fund, Poverty, Development.

## I. INTRODUCTION

Regarding regional administration, Indonesia consists of 34 Provinces, 514 Districts/Cities, and 82,505 Villages/Urban Villages. With these facts, it is unsurprising that decentralization in Indonesia is a very important program (Hofman & Kaiser, 2004, p. 15). There are four dimensions of decentralization, i.e. political decentralization, administrative decentralization, fiscal decentralization, and market or economic decentralization (Kerr et al., 2000, pp. 2-5).

As an implementation of fiscal decentralization, Indonesian government enacted Law Number 22/1999 on Local government and Law Number 25/1999 on Fiscal Balance between Central and Local Government locally called as *Perimbangan Keuangan Antara Pemerintah Pusat dan Daerah* (PKPD) which had been revised several times. The fiscal decentralization followed political and

administrative decentralization as money should follow function (Rahman, 2012).

As an implementation of fiscal decentralization as stipulated by these laws, for the first time in 2001 account of Transfer to Local Government was listed in the budget (APBN). This action marked central government awareness of the importance of financial balance between central and local governments. Central government aspired that development could be witnessed even for people in remote areas. Without the transfer, the convergence process between developed and undeveloped areas in Indonesia could take a very long time (Firdaus, 2017, p. 55).

Further, as a central government commitment to local development, for the first time Village Fund (*Dana Desa*, DD) was allocated in the budget posture in 2015 based on Law Number 6/2014 on Village and Government Regulation (*Peraturan Pemerintah*,

\* Corresponding Author

Phone : +62 813 2805 1551

Email : akhsol@pknstan.ac.id



PP) Number 60/2014 on Village Fund Sourced from Budget (as last amended by Government Regulation Number 8/2016).

This program is continued under the administration of the seventh president of Indonesia. Mr. Jokowi's popularly known program as Nawacita (nine aspirations) in the seventh aspiration reads "develop Indonesia from the periphery by empowering local and village developments in the framework of a unified country". Clearly, the village fund is expected to fulfill its promise as one of the financial instruments which will effectively alleviate poverty and reduce development gaps in local levels by strengthening development and empowering communities.

In the beginning, the village fund allocated in the 2015 budget was merely amounted to IDR9.07 trillion, which then in the 2017 budget was raised very significantly to IDR60 trillion, or a 288.9% hike. The hike was coincidentally correlated with an increasing number of villages from year to year.

Three methods exist to allocate fund to local governments, namely based on (1) certain percentage of central government revenue, (2) common procedure like other expenditures, (3) formula (Bird & Vaillancourt, 1999, p. 30). Although money allocated is steadily increasing, the village fund allocation is not free of critiques from every side such as the parliament, academics, as well as from within the government.

The village fund with formula as stipulated in Government Regulation Number 8/2016 could be seen as equally distributed among villagers. Allocation ratio for the aforementioned government regulation is basic allocation (*alokasi dasar*, AD): formula allocation (*alokasi formula*, AF) equals 90:10. The basic allocation (hereafter referred to as AD) is allocation method in which fund is equally distributed to all villages, while formula allocation (hereafter called AF) is when fund allocated to villages by taking into account villages' characteristics such as population, poverty count, area size, and geographical conditions). Equal allocation 90% for AD could be considered as a bias toward true goals of village fund. This formula also means only 10% of the fund is allocated by taking into account villages' characteristics needed to improve access to basic services and to alleviate village poverty.

By using the formula of AD:AF = 90:10 it is easier to achieve presidential campaign promise of IDR1 billion every village. Previous allocation formula based on Government Regulation 60/2014 disbursed funds based on population (30%), poor population (50%), wide of area (20%), and index of geographical condition.

Several views exist that formula for the village fund allocation is improper (Article 33 Indonesia, 2016; Handra et al., 2017). Article 33 Indonesia (2016) argues that the village fund distributions in 2015 and 2016 were not in favor for poor people, since 90% of the fund was distributed equally to all villages. Therefore, village fund distribution was negatively correlated with a number of poor and near poor people. The similar result is reported by Handra et al. (2017) which reported that village fund formula AD:AF = 90:10 could not fully support for equitable development and access improvement toward public services for poor.

A glance at the data may help to illustrate. Village fund per province in 2017 shows the inequality. As seen in Table 1, Aceh Province received village fund 5 times bigger than NTB Province, albeit the two provinces score relatively similar poverty counts. Similarly, Papua Province received village fund 1.8 times larger than in NTT Province, although a number of poor people in Papua were smaller than in NTT Province.

On the contrary, if the formula for village fund distribution is allocated purely based on AF method, as stipulated by Government Regulation Number 60/2014 before the amendment, it will result in high inequality in terms of village fund between villages. Using village fund data based on budget in 2015, i.e. IDR9.07 trillion, the highest receiver of village fund will earn allocation IDR287.46 million, while the lowest receiver could only get allocation IDR41.26 million. Thus, the ratio between the highest and the lowest is 1:6.9. In addition, to achieve the target of IDR1 billion per village in accordance with vision and mission of President and direction of the Working Cabinet (*Kabinet Kerja*) in 2014-2019, allocation with purely based on AF method would need substantial funding.

To reiterate, based on arguments and facts presented previously, it can be indicated that existing

**Table 1.**  
Distribution of Village Fund (2017)

Province	The Poor (thousand)	Number of Villages	Village Fund Allocated (IDR)
Aceh	859.41	6,474	3,829,751,186
NTB	802.29	995	677,494,427
NTT	1,160.53	2,995	1,849,353,802
Papua	898.21	5,419	3,385,116,457

Source: Ministry of Finance

formula to allocate village fund is at odds with the goal of village fund as a mean to alleviate poverty and improve access to basic services at the lowest level of governments. If the formula for allocation is based solely on the AF method, it will cause higher inequality of fund allocation between villages and thus a lot difficult to achieve political target IDR1 billion per village. Thus, allocation based on formula AD:AF = 90:10 is prone to inequality protest and a revision is needed to cater a more justice aspiration, without the neglected sum of money received by villages.

In this article, justice is defined as fairness as first introduced by Rawls (1999, p. 3). Before Rawls, justice was dominated by utilitarianism proposed by Bentham in which social structure is set up to maximize the sum of total happiness by valuing happiness equally (Lovett, 2011, p. 4). Rawls, on the other hand, values happiness higher for disadvantaged people. Under the difference principle, inequality of distribution is justified when directed toward disadvantaged people (Rawls, 1999, p. 57; Taylor, 2018, p. 40).

This article aims at simulating village fund allocation in order to figure out allocation formula which is more equitable and support for poverty alleviation and development at the village level. The focus is on the division between AD and AF to ensure more equitable and realistic allocation of village fund.

## II. METHOD

Method of analysis is quantitative study through simulation or experiment, i.e. by simulating alternative compositions of AD and AF in the formula of village fund allocation at the District/City level. This simulation involves calculation for 434 districts/cities that receive village fund (DD) as stated in the Ministry of Finance Regulation number 49/2016, with their respective criteria. The simulation could not be implemented at the village level due to data deficiency. In this simulation, it is assumed that no political and administrative hurdles exist for altering the current practice and regulations. This quantitative study basically seeks difference money received by village by altering the composition of AD and AF indicator. After simulation results are obtained, and then the best formula is chosen. This practice is in accordance with the formula allocation method as explained by Bird & Vaillancourt (1999, p. 30).

Choosing the best formula is carried out by three steps. First, set up several alternative compositions of AD:AF and indicators for choosing allocation formula. For simplicity, eight alternatives

are built with a simulation of proportion change every 10%. Thus, alternative 1 means AD:AF = 80:20, alternative 2 is AD:AF = 70:30, until alternative 8 is AD:AF = 10:90. Second, evaluation of criteria in each alternative is carried out using two methods, i.e. descriptive statistic and correlation test. Criteria here means population (*Jumlah Penduduk*, JP), number of poor people (*Jumlah Penduduk Miskin*, JPM), area size (*Luas Wilayah*, LW), and geographical difficulty as proxied by the index of construction price (*Indeks Kemahalan Konstruksi*, IKK) (Kementerian Keuangan, 2017, p. 17).

The third step is choosing the best alternative formula. This last step uses AHP (analytical hierarchy method). Further explanations of the steps follow.

### A. Correlation Test

Correlation is useful to show a relationship between variables or to make a prediction based on the relationship (Sarwono, 2006, p. 120). In this article, the correlation test is used to inquire how strong the relationship between AF criteria, such as JP, JPM, LW, dan IKK toward each village fund allocation for each alternative. This notion is based on the argument that ideally poverty and development indicators i.e. AF criteria (e.g. JP, JPM, LW, and IKK) should correlate to the sum of village fund money received by each village. It is expected that the criteria will correlate strongly to the amount of village fund, thereby supporting the idea to increase AF proportion rather than AD percentage.

In this article, level of correlations are defined as follows (Sarwono, 2006, p. 37): (a) coefficient 0: no correlation, (b) coefficient >0 – 0.25: very low correlation, (c) coefficient >0.25 – 0.45: low correlation, (d) coefficient >0.45 – 0.55: medium correlation, (e) coefficient >0.55 – 0.75: strong correlation, (f) coefficient >0.75 – 0.99: very strong correlation, and (g) coefficient 1: perfect correlation.

Type of correlation test used is a partial correlation, where it estimates relationship strength between two variables without taking into account other variables (*ceteris paribus* assumption). Secondary data for 2017 regarding (1) demography, geography and price data are from BPS, (2) number of villages and district/city areas are formed Minister of Home Affairs Regulation 56/2015, (3) village fund allocation per district/city is from Minister of Finance Regulation 49/2016, and (4) village fund budget and realization data are from national and sub-national reports. The correlation coefficient estimation was implemented using software IBM SPSS 23.

## B. Analytical Hierarchy Process (AHP)

AHP is an effective tool to make a decision in a complex situation, where AHP could help determine priority and choose the best decision (Saaty, 1990). Shortcomings of the AHP include (1) heavily influenced by subjective perceptions of experts as inputs for the AHP and (2) merely using the mathematical method without statistical tests thus it cannot test model significance (Ma'arif & Tanjung, 2013). The AHP procedures were implemented using software Expert Choice 11.

Previous applications of AHP related to village fund include (Article 33 Indonesia, 2016) on village fund, Adli (2006) on village block grant in Padang Pariaman District of Sumatera Barat Province and Widyaningsih (2012) on village fund allocation (*Alokasi Dana Desa*, ADD) in Sragen District of Central Java Province.

In determining priority through AHP, problem or goal will be fragmented to be detailed choice criteria, then be arranged in a hierarchy, and be given a weight based on relative choice toward the criteria. Detailed yet concise steps to use AHP are as follow (Bhushan & Rai, 2004, pp. 15–17):

1. Decomposing problem into a hierarchy which consists of goal, criteria, sub criteria, and alternatives. Criteria were decomposed into seven, i.e. (1) correlation between village fund (DD) and population (JP), (2) correlation between DD and poor population (JPM), (3) correlation between DD and area wide (LW), (4) correlation between DD and infrastructure cost index (IKK), (5) comparison between district with minimum and maximum allocation (min-max ratio), (6) number of village with decreasing DD allocation (vill. no), and (7) money needed to disburse to achieve IDR1 billion per village (min. 1M).
2. Collecting data or views from experts or decision makers regarding the pairwise comparison of alternatives. By pairwise comparisons, each respondent indirectly ranks the criteria. Weight of the criteria was the geometric mean of combined values from experts' perceptions. The weight was automatically produced by the software.
3. Organizing pairwise comparisons from possible alternative into square matrix.
4. Computing eigenvector value, i.e. squaring the matrix and normalize the amount repeatedly until the eigenvector value does not change from the previous result. In squaring matrix, the value in the matrix is altered to decimal and then be squared until resulted square matrix 1 and eigenvector value is obtained by the normalizing sum of the matrix.
5. Evaluating the consistency toward criteria based on the Consistency Index (CI) and Consistency Ratio (CR). CI is obtained by formula:
$$CI = (\lambda_{\max} - n) / (n - 1) \dots\dots\dots (1)$$
where:  
 $\lambda_{\max}$  : maximum eigenvalue;  
 $n$  : matrix size.
6. Further, consistency index is divided by random consistency index to estimate consistency ratio using the formula:
$$CR = CI / RI \dots\dots\dots (2)$$
where:  
 $RI$  : Random Consistency Index.
7. Obtaining the ranking for each alternative in general and decide priority (rating mode).

Respondents as expert group and/or decision makers included in this study consist of 10 (ten) staffs of various units in Ministry of Finance (i.e. Directorate General of Budget, Directorate General of Fiscal Balance, and Fiscal Policy Agency) who have authority, knowledge and experience related to policy formulation, planning, managing and evaluating the village fund. Representativeness of respondents in terms of ranks is also taken into account so that respondents consisted of three echelons 3, three echelon 4, and four experienced staffs. The respondents were requested to choose between AF criteria (JP, JPM, LW, and IKK) which one is more important than the other in pairwise comparison in an AHP setting.

## III. RESULTS AND DISCUSSION

### A. Distribution of Village Funds Based on Existing Formula

The existing formula, i.e. basic allocation: formula allocation = 90:10, may not serve to alleviate poverty and improve development as intended. For example, based on budget 2017, the biggest village fund amount IDR635.31 billion was allocated to Aceh Utara District which has the largest villages, i.e. 852 villages. The smallest village fund amount IDR12.84 billion was allocated to Prabumulih City which has the smallest number of villages, i.e. only 12 villages. Regarding other indicators, the largest population (JP) and population under poverty (JPM) were in Bogor District, with JP amount 12,552,430 people and JPM amount 490,800 people, or 3.91% of JP is

JPM. Albeit has high poverty count, Bogor District received total village fund a lot smaller than Aceh Utara District (although in terms of average village fund per village is higher than Aceh Utara District). Total village fund received by Bogor District was IDR371.99 billion or on average IDR894.3 million per village.

The widest area size (LW) was Merauke District which has 44,071 km<sup>2</sup>, while the tiniest LW was Puncak District which has only 454.67km<sup>2</sup>. With the staggering difference in area size, the total village fund received by these two districts were relatively similar, i.e. IDR150.95 billion and IDR168.80 billion for Merauke District and Puncak District, respectively.

Correlation test for indicators of 434 districts/cities in 2017 budget shows significant relationship albeit medium or very low correlation between total village funds (DD) with a number of populations under poverty (JPM), area size (LW), and geographical condition (IKK). The positive sign of correlation coefficients shows a similar direction between the three criteria to DD, i.e. if JPM, LW, or IKK increases (decreases) then DD will also increase (decrease). Further, the correlation between DD-JPM is medium in strength. The correlation between DD-LW is very low as well as correlation DD-IKK.

A different result is shown for the correlation between DD and JP. The result indicates a negative relationship between village fund (DD) and a number of population (JP), meaning that District/City with larger population does not necessarily receive a bigger village fund. Result of correlation test can be seen in Table 2.

Previous description and estimation indicate that village fund (DD) allocated based on an existing formula (AD:AF = 90:10) does not favor poverty and development indicators. From previous anecdotal yet compelling examples, District/City with larger population and poverty rate does not necessarily receive larger village fund than District/City with smaller population and poverty rate but has a larger number of the village. In addition, District/City with larger area size and higher construction cost does not guarantee will receive larger village fund allocation.

Furthermore, the correlation test also produces similar results. Correlations between village funds and the poverty rate are medium, and unfortunately, very low correlation is observed for relationships between village funds and an area size and geographical condition. The correlation results show that by using existing formula (AD:AF = 90:10), it follows that, at least if viewed from the district level, village disbursement is unconditional of local conditions and needs. The disbursements

**Table 2.**

Correlation Test for Formula 90:10

	JP	JPM	IKK	LW
Correlation	-0.139	0.550	0.167	0.141
Sig. (2-tail)	0.004	0.000	0.000	0.003

Source: Authors' calculation

are more influenced by a number of villages in the respective district. Moreover, the relationship between the village fund (DD) and population (JP) is contrary to expectation. DD allocation should have a positive correlation to JP and not negative correlation as shown in Table 2.

The existing formula as stipulated by Government Regulation Number 8/2016 thus may not be as just as and in line with the goal of village fund as mandated, i.e. to decrease poverty and increase development in the villages. From previous discussion it is clear that existing allocation formula AD:AF = 90:10 can be seen as unjust because the village funds are "equally" distributed without considering poverty and development indicators.

## B. Results of Alternative Simulations

Results for simulation of 8 alternatives village funds formula show that changing the AF formula (i.e. increase AF formula from existing 10% to 20% in alternative 1 and up to 90% in alternative 8) will obviously change village funds received by each village. Specifically, villages in District/City which has higher poverty and development indicators will receive higher village funds than existing condition. For example, in alternative 1 (i.e. increasing AF by 10% to 20%) there will be 45,650 villages or 60.9% of total villages in Indonesia will receive village funds smaller than funds received under the existing formula. Of course, this condition is unfavorable for villages which have received larger share under existing formula, a situation that should be considered seriously by decision makers.

However, changing AF more than 10% (as represented by alternative 2 to alternative 8) does not change much the number of the village which receive the smaller fund. From simulations of eight alternatives, number of villages with smaller funds range from 60.9% (alternative 1) to 63.81%. In alternative 2, the number of the village with smaller funds represents the largest number, i.e. 47,831 villages. In another alternative, the marginal decrease is much smaller compared to alternative 2. Thus, simulation results show variations in the number of villages which suffer from decreasing

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funds allocation.

Regarding ratio min-max, i.e. comparison between the largest allocation and smallest allocation, simulation results show that the higher AF proportion, the higher inequality between the maximum and minimum allocation. For example, in alternative 1, ratio min-max is 2.92, meaning that maximum allocation is 2.92 times higher than minimum allocation. In alternative 8, the ratio is a lot higher, i.e. 24.81 times. It is clear that this number is too high, and it may trigger unintended protests from unfortunate villages.

Regarding required funds to achieve target IDR1 billion per village, the simulation results show similar outcomes as with min-max ratio. The higher AF proportion will lead to more inequality in fund allocation between villages. For example, in alternative 1, to achieve a target IDR1 billion per village needs only IDR88.90 trillion. An additional fund to fulfill the target is only IDR28.90 trillion from existing village funds (i.e. IDR60 trillion in 2017 and 2018). The largest funds needed to fulfill IDR1 billion per village is shown in alternative 8, unsurprisingly. Under alternative 8, central government needs to allocate IDR244.17 trillion of village fund, or about 4 times higher than existing village fund allocation. This spike clearly will add more burden to the government budget. Results of the analysis of the indicators could be seen in Figure 1.

Furthermore, results of correlation analysis between fund allocation to poverty and development indicators show that the higher AF proportion,

**Table 3.**

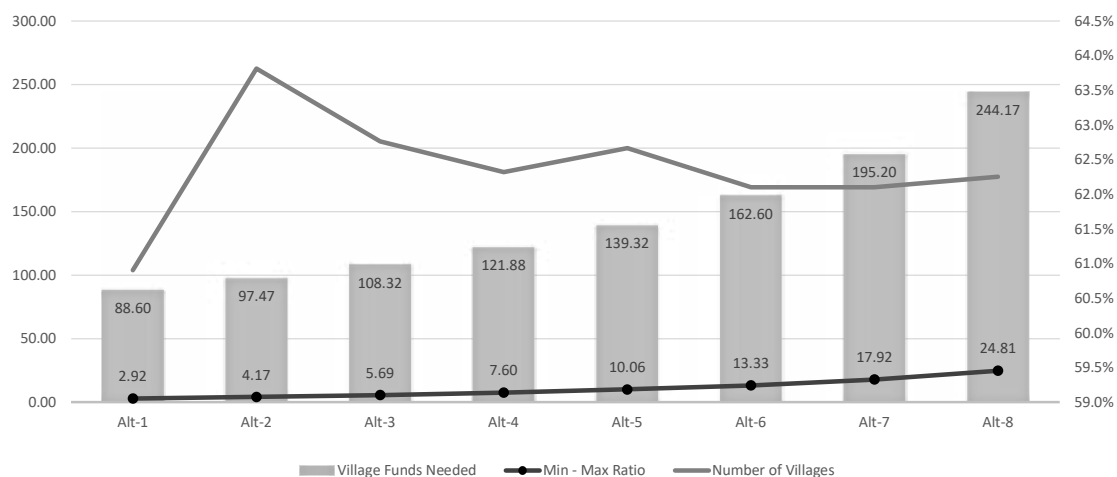
Correlation between DDs and Poverty/Development Indicators

	DD Alt1	DD Alt2	DD Alt3	DD Alt4	DD Alt5	DD Alt6	DD Alt7	DD Alt8
JP	-0.24	0.06	0.17	0.32	0.50	0.70	0.87	0.97
JPM	0.57	0.61	0.66	0.72	0.78	0.85	0.92	0.98
LW	0.20	0.24	0.30	0.37	0.46	0.59	0.75	0.92
IKK	0.18	0.22	0.27	0.33	0.42	0.55	0.72	0.91

Source: Authors' calculation

the higher correlation between DD to poverty and development indicators (i.e. JP, JPM, LW, and IKK) in the respective District/City. It can be seen, as shown in Table 3, that correlation coefficient for each criterion is higher when AF proportion increases by 10%.

For example, the correlation between DD and JP in alternative 2 is significant but much lower compared to alternative 8 when the correlation is very strong. Regarding the correlation between DD and JPM, the correlation is strong starting at alternative 1 and become very strong starting from alternative 5. Regarding the correlation between DD and LW and IKK, the results show almost similar patterns. At alternative 5 correlation between DD and LW shows medium correlation and become very strong at alternative 7 and alternative 8; while correlation between DD and IKK only reaches



**Figure 1.** Simulations for Village Funds Needed

Note:

solid bar

solid line

dashed line

= village fund needed, uses left axis;

= number of villages, use right axis;

= min-max ratio, use right axis

medium correlation starting at alternative 6 and becomes very strong correlation at alternative 8.

Based on correlation results it can be shown clearly that the higher AF proportion is needed in order for DD to have a stronger correlation with poverty and development indicators. It should be noted that village funds should be allocated by taking into account criteria such as JP, JPM, LW, and IKK in order for DD to achieve its goal. The goal of DD as stipulated in Law on Village should become the main reference for policy recommendation.

Allocating village fund by taking into account poverty indicators such as population (JP) and poverty rate (JPM) are also in line with the principle of justice especially the difference principle (Lovett, 2011, p. 56; Taylor, 2018, p. 40). Injustice in term of social or economic is a non-ideal condition so that to achieve just condition it is accepted to give priority to unfortunate people or communities. The principle is called the difference principle since basically equal treatment is needed to achieve just condition. Unequal treatment or different treatment is only justified when applied to the unlucky part of society.

Prioritizing the poor people could be shown by allocating larger village fund to villages which have higher JP and JPM. Likewise, a village which has a wider area (LW) and more costly construction cost will need more fund for its development. If no more equitable funds are given to villages with lower LW and IKK, then inequality will still occur, and the village will become increasingly lagging behind

other villages. As with Solow's growth theory (Nakamura, 2001, p. 332), one aspect affecting growth is physical capital. That way, the injection of funds from the central government in the form of DD will stimulate the region to invest in public infrastructure development. This will lead to better economic growth so that the remaining villages are expected to catch up. Under Solow convergence theory (Nakamura, 2001, p. 324), pumping capital to low-income villages will accelerate economic growth and allow the developing villages to grow faster toward more prosperity.

Thus, from the simulation results it appears that to achieve better values of justice, it is appropriate that the proportion of AF is enlarged so that the allocated funds will support poverty and development indicators. However, enlarging the proportion of AF will cause problems (1) there will be considerable inequality in inter-village allocations, (2) there are villages whose DD revenues decrease and (3) it requires a large budget. Better and more comprehensive consideration of proposed alternatives requires views from competent and experienced resource persons regarding the formulation of a DD allocation policy. The procedure is explained below.

### C. Choosing Best Alternative

The results of pairwise comparison matrices for each criterion show mixed values for each comparative value, where an assessment of four criteria for poverty indicators and overall

**Table 4.**  
Pairwise Comparison Matrix of Paired Indicators

	Corr. DD-JP	Corr. DD-JPM	Corr. DD-LW	Corr. DD-IKK	Min-Max Ratio	Vill. No	Min. 1M
Corr. DD-JP	--	5.129	1.835	3.987	1.469	1.769	1.469
Corr. DD-JPM	5.129	--	3,650	1.931	3.761	3.534	2.656
Corr. DD-LW	1.835	3,650	--	3.084	2.867	2.019	1.758
Corr. DD-IKK	3.987	1.931	3.084	--	4.809	4.478	2.774
Min-Max Ratio	1.469	3.761	2.867	4.809	--	1.011	1.022
Vill. No	1.769	3.534	2.019	4.478	1.011	--	1.316
Min. 1M	1.469	2.656	1.758	2.774	1.022	1.316	--

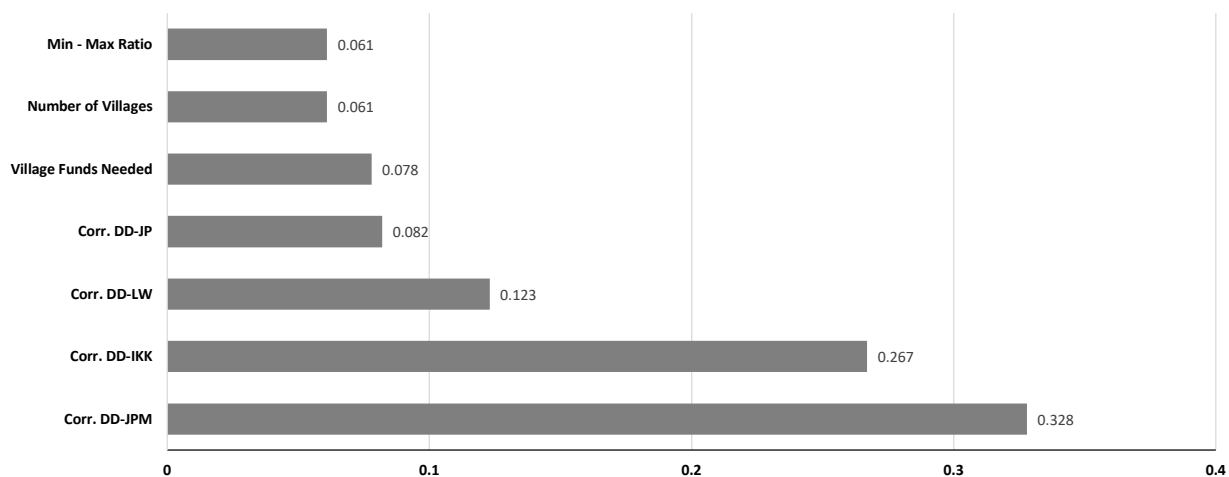
Source: Authors' calculation

Note:

Corr. = Correlation;

Vill. No. = Decreasing Number of Village Getting DD;

Min 1 M = Minimum 1 billion rupiahs per village



Source: Authors' calculation

**Figure 2.** Eigenvector Values of Indicators

development has greater weight when compared to the revenue and budget indicators. In detail, the combined value of the geometric mean is shown in Table 4.

From the priority synthesis result, it can be seen that ideally, DD correlation indicator with JPM is the most priority in the formulation of DD allocation compared with six other indicators. Priority synthesis is also ranked based on the calculation of eigenvector value. From the result of the combination assessment, the weight of correlation between DD and JPM has the highest eigenvector value. Then, the second priority indicator in the ideal formulation of DD allocation is the correlation of DD with IKK. The third and fourth priority indicators which are also considered important according to the expert group are the correlation of DD with LW and the correlation of DD with JP. Furthermore, the indicators based on the fifth, sixth and seventh priority order are the number of funds needed to achieve the target IDR1B/village, the ratio between the lowest and highest DD receipts, and the number of villages whose DD receipts fall. The priority weighting results are set forth in Figure 2.

Based on the combined weight and priority of these experts, it is known that poverty criteria are the most priority to be considered in the formulation of DD allocation. In total, the expert group considers that the allocated DD should be correlated with the existing JPM in the village. Furthermore, the priority that is not less important is the development criteria, where the correlation DD with IKK ranks second. Two other criteria are also indicators of poverty and development, namely the correlation of DD with LW and JP ranks third and fourth, while

the criteria on revenue and budget indicators only occupy the last three priority order. This shows that based on expert perceptions, the proportion of ideal and fairer formulas is more concerned with poverty and development than equal distribution and achievement of targets. This weighted result leads to the proposal of enlarging the proportion of AF rather than maintaining the proportion of AD. According to the expert's view, the proposed formula is that the AF proportion is larger than AD.

Furthermore, each alternative (alternative 1 to alternative 8) is compared in pairs to find out how

**Table 5.**  
Eigenvector Value and Alternative Rank

	Corr. JP	Corr. JPM	Corr. LW	Corr. IKK	Min - Max	Vill. No.	Min. 1 M
Alt-1	0.024	0.063	0.022	0.026	0.252	0.401	0.255
	6	5	7	7	1	1	1
Alt-2	0.024	0.063	0.022	0.026	0.224	0.022	0.233
	6	5	7	7	2	8	2
Alt-3	0.024	0.063	0.044	0.057	0.173	0.062	0.172
	6	5	5	4	3	7	3
Alt-4	0.050	0.063	0.044	0.057	0.137	0.102	0.137
	5	5	5	4	4	5	4
Alt-5	0.093	0.188	0.090	0.057	0.104	0.069	0.103
	4	1	4	4	5	6	5



	Corr. JP	Corr. JPM	Corr. LW	Corr. IKK	Min - Max	Vill. No.	Min. 1 M
Alt-6	0.168	0.188	0.165	0.128	0.057	0.115	0.057
	3	1	3	3	6	2	6
Alt-7	0.309	0.188	0.307	0.238	0.035	0.115	0.034
	1	1	1	2	7	2	7
Alt-8	0.309	0.188	0.307	0.412	0.019	0.113	0.019
	1	1	1	1	8	4	8

Source: Authors' calculation

Note:

1st row = eigenvalue;

2nd row = rank

much its relative weight is to other alternatives. JP, JPM, LW and IKK values of each alternative are compared based on their correlation level. From the result of the weighting of the indicator, it is obtained distributive mode from each alternative in each criterion. The weight value of each alternative in each criterion is made matrix and eigenvectors are calculated (see Table 5).

The CR calculation on the combined ratio for the combined criteria assessment in this study shows a consistent value of 0.03. Overall the respondents are consistent, shown by CR of all respondents did not exceed 0.1. In more detail, it can be said also every assessment/weighting criterion conducted by each respondent can be used entirely in the model. This is because each respondent gives a CR rating which not exceeding 0.1. Also, with the categorization is done on the indicator value of each alternative. CR

**Table 6.**  
Consistency Ratio (CR)

	CR
Corr. JP	0.04
Corr. JPM	0.00
Corr. LW	0.04
Corr. IKK	0.03
Min-Max Ratio	0.02
Vill. No.	0.02
Min. 1M	0.02

Source: Authors' calculation

for each alternative is acceptable and be consistent with values above 0.1 on all alternatives. More detailed CR scores are presented in Table 6.

Thus, the overall consistency calculation result of all indicators in the alternative priority hierarchy model shows the CR value of 0.02. This shows that the assessment and weighting of the whole model (either criterion or alternative) can be said to be consistent, where the value does not exceed 0.1 or inconsistency <10%. These results show the AHP model used to define alternative priorities of DD formulas based on the assessments made by the expert group can be accepted and used.

Based on the synthesis results to select DD allocation formula, it is seen that alternative ranking with an ideal model which becomes the priority of choice by ranking is alternative 8, alternative 7, alternative 6, alternative 5, alternative 1, alternative 2, alternative 3, and alternative 4. Alternative 8 is the main priority with the eigenvector value of 0.220. The second priority falls on alternative 7 with a value of 0.192.

With a high weight (based on expert perception) on poverty and development indicators compared to the revenue and budget indicators, this makes the alternative with large AF proportions more prioritized to be selected. It can be seen that alternatives with a larger proportion of AF than AD is in the top four priority ranks. When considered in more detail, the main priority falls in alternative 8 is strongly influenced by its correlation level with IKK. From other criteria i.e. JP, JPM and LW correlations between alternative 8 and alternative 7 have the same correlation level. Even from the assessment of the revenue and budget indicators (the ratio of min-max and the number of funds to reach the target) alternative 7 has better priority values. The only difference is that in the correlation of IKK in alternative 8 has a very strong correlation whereas in alternative 7 only strongly correlates (<0.75). With the correlation of IKK that is in the second priority after JPM correlation based on criteria by the experts, alternative 8 with AD:AF = 10:90 becomes the chosen formula based on the expert group's perception.

#### D. Implications for Chosen Formula

Choosing of alternative 8 with the proportion of AD:AF = 10:90 absolutely will change the composition of allocation fund. The average AD received equal to each village amounted to IDR80.05 million. The equally divided AD allocation falls significantly, becoming IDR640.39 million from IDR720.44 million in the existing condition (90% proportion as per PP No. 8/2016). As for AF, it gets a

**Table 7.**

Highest and Lowest Recipients of DD Based on Existing Regulation (PMK 49/2016) and the Proposal (Alternative 8)

	Existing Regulation (AD:AF = 90:10)		Proposal 8 (AD:AF = 10:90)	
	Highest	Lowest	Highest	Lowest
	Aceh Utara District	Prabumulih City	Bogor District	Sawahlunto City
DD (billion)	635.31	12.84	1,061.57	37.94
Village	852	12	416	27
DD per village	0.75	1.07	2.55	1.40
JP	739,871	222,742	12,552,430	34,715
DD per JP	0.00086	0.00006	0.00008	0.00109
JPM	115,050	20,470	490,800	1,340
DD per JPM	0.00552	0.00063	0.00216	0.02832
LW	3,236.86	251.94	2,710.62	231.93
DD per LW	0.20	0.05	0.39	0.16
IKK	104.28	103.31	109.90	96.62

Source: Authors' calculation

much larger proportion to be allocated based on the indicator value of each village.

At the district/city level, the largest DD is allocated to District of Bogor with an allocation of IDR1.06 trillion allocated to 416 villages. Therefore, the average income per village is IDR2.55 billion. This tends to be more equitable because District of Bogor has the highest JP and JPM, which is 12,552,430 people and 490,800 people, respectively. The district/city receiving the lowest DD allocation goes to Sawahlunto City with an allocation of IDR37.49 billion allocated to 27 villages so that each village averaged IDR1.04 billion. Sawahlunto City has a small number of villages and indicators of poverty are also relatively small, namely JP as many as 34,715 people, JPM as many as 1340 people, LW of 232 km2 and IKK of 96.62.

The distribution of this DD allocation when compared to the existing formula AD:AF = 90:10 also shows better allocation and more equitable. In the existing formula, the district/city that receives the largest allocation is District of Aceh Utara which is also the district/city with the greatest number of villages. District/city with lowest DD allocation acceptance is the City of Prabumulih which is also the district/city with the lowest number of villages; although on average their poverty and its development indicators are greater than the average indicators in District of Aceh Utara. The district/city comparison with the highest and lowest receipts is summarized as Table 7.

**Table 8.**

Comparison of Existing and Proposed Formula

	Aceh Utara District	Prabumulih City	Bogor District	Sabang City	Sawahlunto City
Village					
Num	852	12	416	18	27
Criteria					
JP	739,871	222,742	12,552,430	26,578	34,715
JPM	115,050	20,470	490,800	5,810	1,340
LW	3,236.86	251.94	2,710.62	153.00	231.93
IKK	104.28	103.31	109.90	96.14	96.62
DD Allocation					
DD exist	635.31	12.84	372.00	17.29	23.67
DD Alt1	582.82	21.41	494.91	20.06	25.24
DD Alt2	533.21	27.32	575.86	22.89	27.06

	Aceh Utara District	Prabumulih City	Bogor District	Sabang City	Sawahlunto City
DD Alt3	483.61	33.22	656.81	25.71	28.87
DD Alt4	434.01	39.12	737.77	28.54	30.69
DD Alt5	384.41	45.02	818.72	31.37	32.50
DD Alt6	334.81	50.93	899.67	34.19	34.32
DD Alt7	285.21	56.83	980.62	37.02	36.13
DD Alt8	235.61	62.73	1,061.58	39.85	37.95

Source: Authors' calculation

Notes:

Green cells = largest;

Orange cells = lowest.

By increasing gradually, the proportion of AF, the composition of DD received by each village will change. In effect, districts/cities that receive the largest and smallest DD will also change. The simulation results of 434 districts/cities that received DD allocations in 2017 as in PMK 49/2016 shows, by increasing AF by 10% (alt. 1), the lowest DD allocation recipient changed to City of Sabang which had relatively lower criteria compared to City of Prabumulih even though the City of Sabang has more villages. By increasing the proportion of AF to 20% (alt. 2) and so on to 60% (alt. 6), the highest recipient of DD allocation is no longer North Aceh District, but changes to Bogor Regency which also has the largest JP and JPM among 434 districts/cities DD receiver that was simulated. Furthermore, if the proportion of AF increases to 70% (alt. 7) and 80% (alt. 8), then the lowest DD allocation recipient

changes again to the City of Sawahlunto, which is also the city with the lowest number of poor people. These results are explained in Table 8.

Compared with the existing formula, when viewed from the level of correlation with poverty indicators and development, it will get a better value on alternative formulas 8 (AD:AF = 10:90). This is indicated by the level of correlation across criteria (the correlation DD with JP, JPM, LW, and IKK) has values above 0.75 or at very strong relation levels.

This suggests alternative formula 8 is more equitable by adjusting the budget allocated to villages with indicators of poverty and its development. The allocation of funds adjusted to the needs and conditions in the village is expected that poverty problems will be more quickly resolved, and the acceleration of development can be achieved. The underdeveloped villages are expected to catch up with more advanced villages and the difference between the two categories is expected to decrease through more targeted allocations, assuming that developed regions grow at a slower pace and developing villages will grow faster because of additional funds for development provided by the village funds program.

However, alternative 8 has some drawbacks compared to the existing formula. If the formulation of AD:AF = 10:90 is applied, there will be 46,661 villages whose revenues decrease from the allocations received in 2017. The number of villages that fall is more than the villages whose revenues increase, reaching 62.25% of the total village. As discussed earlier, the lowest and highest ratios reached 24.81 times, whereas in the existing formula the ratio was only 1.8 times; so, the alternative option might be an unpopular decision for most villages. In addition, if we want to achieve the target as the President's vision and the policy direction

**Table 9.**  
Comparison of Existing and Proposed Formula

	Existing (AD:AF = 90:10)	Proposal (AD:AF = 10:90)
Corr. JP	-0.14	0.97
Corr. JPM	0.55	0.98
Corr. LW	0.17	0.92
Corr. IKK	0.14	0.91
Min-Max Ratio	1.80	24.81
Vill. No.	-	46,661
Min. 1M	81.05	244.17

Source: Authors' calculation

of the Working Cabinet 2014-2019 it will require a very large budget of DD, which reached IDR244.17 trillion. Differences in the formula applied and the proposed formula (alternative 8) is shown in Table 8.

#### IV. CONCLUSION

From the results of the statistical comparison and correlation testing, the formulation that applies as in Government Regulation No. 8/2016 cannot be fully considered equitable. In this case, the formulation of AD:AF = 90:10 has not shown a preference for poverty and development indicators. This is indicated by correlation test which showing the moderate relationship between DD allocation and JPM, very weak relationship among DD with LW and IKK indicators, whereas between DD and JP actually shows no significant relationship.

As in the previous discussion, it was proposed that the ratio of AF should be increased to 90 percent as in alternative 8. With the greater proportion of AF as proposed (AD:AF = 10:90), the correlation or relationship between DD allocated to poverty and development indicators will be stronger. With a more equitable allocation of DD according to the conditions and needs of the village (Lewis, 2015), the village head has more resources to provide access and programs that lead to poverty alleviation. In addition, the injection of funds from the Central Government in the form of DD associated with the geographical conditions of the region will stimulate villages to invest in public infrastructure development. This will lead to better economic growth so that the underdeveloped villages are expected to catch up. Economic and social issues are more quickly resolved. Underdeveloped villages can catch up if the incentive in terms of the amount of DD received is relatively larger than the developed ones.

On the other hand, the implementation of this formula also has a drawback. It requires enormous funds if the government wants to achieve targets of IDR1 billion per village, i.e. it needs a budget of IDR244.17 trillion. To be able to achieve such a large DD budget allocation it will likely take a long period, so the government needs to develop a roadmap. The government also needs to be careful if this policy will be implemented because this is an unpopular decision which will have 46,661 villages whose DD allocation decrease from existing.

Nevertheless, the formula AD:AF = 10:90 is feasible to propose because it would be fairer if it is seen based on the difference principle on the concept of justice according to Rawls. Disadvantaged communities will benefit more from government

sustainability. This proposal is expected to shed light on the ideal formulation that needs to be achieved in the future budgeting period so that fairer DD allocation can be felt more in the village level.

This article, however, does not dwell further whether additional fund allocated through bigger AF method will produce a better result. Previous literature points out (e.g. Aziz, 2016, p. 209) that village autonomy in managing fund does not necessarily increase its effectiveness. Hence, further research could focus on its effectiveness since this article focuses on the equality issue. Learning from Village Fund Allocation (Alokasi Dana Desa, ADD), the success of the program may also depend on community participation in planning, actuating, and controlling (Kartika, 2012, p. 189).

In addition, the allocation of DD should also consider the composition of the Affirmations Allocation (AA). This study has not yet accommodated the calculation of AA composition as the new formula used by the Government in DD allocation just started in 2018. Non-inclusion of this indicator can be considered as a limitation of this study. Next researchers could include this indicator in the future analyses.

#### ACKNOWLEDGMENT

The authors express their gratitude to the Fiscal Policy Agency (BKF), Directorate General Fiscal Balance (DJPK), and Directorate General Budgeting (DJA) of Ministry of Finance which have provided data for this study. Special thanks to the expert group who participated as resource persons in AHP. Researchers also thank two anonymous reviewers for their valuable comments.

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