Gini Ratio Analysis in North Buton Regency

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Abstract

This research was carried out in North Buton Regency in 2020. The purpose of this study was to determine the income inequality of the community both between the Regency and the District and between the District and the District and the variables that cause income inequality in the North Buton Regency. The results of the Gini Ratio analysis show that the income distribution of the people of North Buton Regency is relatively unequal with a Gini coefficient value of 0.36. Districts with low-income inequality (a) West Kulisusu District with a Gini coefficient of 0.24 (b) and Bonegunu District with a Gini coefficient of 0.29. Having moderate-income inequality (a) Kulisusu sub-district with a Gini coefficient of 0.32. (b) Wakorumba sub-district with a Gini coefficient of 0.32 and (c) Kambowa District with a Gini coefficient of 0.37. Meanwhile, sub-districts that have high-income inequality (a) North Kulisusu sub-district have a Gini coefficient of 0.43. The main variables that cause income inequality in North Buton Regency are differences in natural resource potential, differences in community skills and work ethic, differences in ownership of production factors, differences in regional accessibility, differences in community livelihoods, and government and private investment.

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1 Introduction

Economic growth must be inclusive, namely, a growth that can provide benefits and be enjoyed by the entire community fairly and equitably or growth that is pro-growth, pro-job, pro-poor, and pro-environment. Economic growth-oriented development has shown success in various development sectors of the North Buton Regency as measured by the level of real economic growth, per capita income, and employment opportunities (Bento, 2018). On the other hand, it shows that high economic growth has resulted in the widening of the gap between community groups and the gap between sub-districts. Income inequality is a difference or gap in the distribution of income or remuneration from production factors between individuals, between community groups, and between sub-districts due to an unequal distribution of income distribution (Choe, 2008; Torras & Boyce, 1998).

Various simulations of the development program of North Buton Regency have been carried out to overcome poverty and inequality between groups of people have not succeeded well so that the allocation of development budgeting as an instrument to reduce poverty and inequality in development between districts, economic inequality between communities which results in social and cultural inequality between groups The community needs attention to be evaluated in the future (Eisenberg, 2015; Brown, 1994). The development budget allocation strategy in addition to being able to encourage the acceleration of economic growth in North Buton Regency is also a strong instrument in reducing poverty and economic inequality between community groups through the process of accumulation and mobilization of local resources in each District because the diversity of resource characteristics of each District is a tendency for inequality between sectors economy.

Gini ratio is one indicator used to measure the level of development inequality and income inequality. The facts show that the high economic growth of the North Buton Regency is 6.5 percent, followed by a high poverty rate of 14.2 percent of the population. This condition can be concluded that there is an error in the concept of development (Farinelli et al., 2008; Dagum, 1990). In the sense that the aggressiveness of the business world and the allocation of the development budget of the North Buton Regency have no impact on the level of collective welfare of the community (Di Castelnuovo et al., 2020; Lerman & Yitzhaki, 1984).

Economic growth is caused by an increase in income and changes in income distribution, but an increase in income does not have much effect on the economic growth of a region (Fernandez-Morales, 2003; Chen et al., 2017). Meanwhile, the increase in income and income distribution will encourage a real increase in economic growth. Therefore, the income inequality analysis of the people of North Buton Regency is very important to determine the level of income distribution achieved with a high level of economic growth in North Buton Regency, and to find out the comparison of the level of income distribution among the North Buton District, so that there are program efforts from the government. North Buton Regency to develop sub-districts whose per capita income is still low.

2 Materials and Methods

The Gini coefficient is a measure of the degree of inequality in the distribution of income within a country/region. Gini coefficient is an aggregate inequality, its value lies between 0 (perfect equality) to 1 (perfect inequality). Mathematically the Gini coefficient formula is presented by Lincolin Arsyad (2004), as follows:

$$KG = 1 - \sum_1^n (X_{i+1} - X_i)(Y_1 + Y_{i+1})$$

or

$$KG = 1 - \sum_1^n f_1(Y_1 + Y_{i+1})$$

Information:
KG   = Gini Coefficient
Xi   = Proportion of cumulative number of households in class i
fi   = Proportion of number of households in class i

3   Results and Discussions

Gini ratio analysis in North Buton Regency

The respondents of this study were based on the type of livelihood of the residents of North Buton Regency which was determined by the economic sector group. The results of the analysis obtained a Gini coefficient of 0.36 or the level of income inequality of the people of North Buton Regency is relatively high, but still moderate, which is still close to the tolerance limit of 0.4.

Table 1
Results of Gini coefficient analysis in North Buton Regency in 2019

	Yi	f %	(yi)	Y*	Y* -1	Y* + Yi*-1	fi(Y* + Yi*-1)
1	10.890.000	0,1	0,0327	0,0327	0	0,03	0,00327
2	14.298.000	0,1	0,0429	0,0757	0,01235	0,09	0,00880
3	17.042.000	0,1	0,0512	0,1268	0,03897	0,17	0,01658
4	21.091.167	0,1	0,0634	0,2031	0,07485	0,28	0,02779
5	25.373.333	0,1	0,0762	0,2793	0,13410	0,41	0,04134
6	32.609.167	0,1	0,0979	0,3772	0,19334	0,57	0,05706
7	36.752.333	0,1	0,1104	0,4876	0,26513	0,75	0,07528
8	47.012.000	0,1	0,1412	0,6288	0,35735	0,99	0,09862
9	127.850.000	0,1	0,3840	1,0129	0,46940	1,48	0,14823
10	-	0,1	0,0000	1,0129	0,61008	1,62	0,16229
Total	332.918.000	1			1,00000		0,63925
						CG	0,36

Source: Primary Data in Processing

The results of the analysis of the Gini Ratio of North Buton Regency of 0.36 show that the income inequality of the community is relatively high when compared to the Gini ratio of Southeast Sulawesi of 0.31 and the Gini ratio of Sulawesi Island of 0.28. The Lorenz curve depicts the distribution function of the cumulative income of the people of the North Buton Regency. The Gini coefficient is calculated from the area A divided by the area (A + B). Since (A+B) = 0.5, then: G = A/0.5 = 2A = 1 – 2B. If the Lorenz curve is expressed by the function Y = L(X), then the value of B is obtained by finding the integral value of the function so that the Gini coefficient becomes:

$$1 - 2 \int_0^1 L(x)dx = 1 - 0,63925 = 0,36$$

The results of the analysis of income disparities between community groups are shown in Table 2:

Table 2
Income disparity between community groups North Buton Regency 2019

No.	Community group	Earnings
1	40% lowest income	11,22
2	40% lowest income	25,85
3	20% lowest income	62,93

Source: Research results, processed data

Table 2 shows that 40 percent of the lowest income group earns 11.22 percent of the total income. Meanwhile, 40 percent of the middle-income group received 25.85 percent of the total income, and 20 percent of the high-income group received 62.93 percent of the total income. The results of the analysis indicate that the income distribution of the people of the North Buton Regency is relatively unequal. The above argument is supported by the results of the

study, where the highest income of respondents in the last month reached IDR. 9.500.000,- While the lowest income is only IDR. 130.000,-. The average income of respondents is IDR. 2,533,950,-. The highest income is obtained from community groups who work as traders, while the lowest income is obtained from community groups who work as farmers and traditional fishermen.

Subdistrict Gini ratio analysis

To find out the inequality between the Districts of North Buton Regency, the Gini index for each sub-district is calculated. Meanwhile, knowing the inequality between sub-districts and districts, a comparison of the average district income with the district average income is carried out. If the average sub-district income is lower than the district average, it means that there is an imbalance between sub-districts and districts (Brooks et al., 2003; Budiharsono, 1989; Cassimon & Van Campenhout, 2007). The distribution of income between sub-districts can be seen from the following Gini Ratio analysis results:

- Gini ratio analysis in Kulisusu District
  The residents of Kulisusu Subdistrict generally make a living as farmers, fishermen, traders, and several other micro-small businesses. To find out the income inequality of Kulisusu District, respondents were determined according to the proportion of types of livelihoods cultivated (García-Peñalosa & Turnovsky, 2005; Adelman & Chenery, 1966). Based on the results of the analysis obtained information on income inequality in Kulisusu District is relatively moderate with a Gini Ratio of 0.32.

Table 3
Results of Gini analysis in Kulisusu District in 2019

	Yi	f %	(yi)	Y*	Y* -1	Y* + Yi*-1	fi(Y* + Yi*-1)
1	2.510.000	0,1	0,0327	0,0327	0	0,03	0,00327
2	3.870.000	0,1	0,0429	0,0757	0,01235	0,09	0,00880
3	4.980.000	0,1	0,0512	0,1268	0,03897	0,17	0,01658
4	6.665.000	0,1	0,0634	0,2031	0,07485	0,28	0,02779
5	9.560.000	0,1	0,0762	0,2793	0,13410	0,41	0,04134
6	10.890.000	0,1	0,0979	0,3772	0,19334	0,57	0,05706
7	14.298.000	0,1	0,1104	0,4876	0,26513	0,75	0,07528
8	17.042.000	0,1	0,1412	0,6288	0,35735	0,99	0,09862
9	21.091.167	0,1	0,2840	1,0129	0,46940	1,48	0,14823
10	25.373.333	0,1	0,3956	1,0129	0,61008	1,62	0,16229
Total	332.918.000	1			1,00000		0,63925
						CG	0,32

Source: Primary data in processing

The results of the analysis in Table 3 show that the distribution of people's income in Kulisusu District is relatively unequal when it is seen that the average community income in Kulisusu District is IDR. 919,500.- still low compared to the average income of the North Buton Regency of IDR. 1.201.734. This means that there is a disparity between the average sub-district income and the district average income. The results of respondents, about 56.67 percent earn less than the district average income, and as many as 43.33 percent earn above the district average income.

- Gini ratio analysis in North Kulisusu District
  The results of the Gini Ratio analysis show that the income distribution of the people of North Kulisusu District is very unequal with a Gini Ratio of 0.43. According to Oshima, inequality that exceeds 0.4 is classified as high inequality. This can be seen in Table 4.

Table 4
Results of Gini coefficient analysis in North Kulisusu District in 2019

	Yi	f %	(yi)	Y*	Y* -1	Y* + Yi*-1	fi(Y* + Yi*-1)
1	2.100.000	0,2	0,0501	0,0501	0	0,05	0,01001
2	3.100.000	0,2	0,0739	0,1240	0,05006	0,17	0,03480
3	4.200.000	0,2	0,1001	0,2241	0,12396	0,35	0,06961
4	8.800.000	0,2	0,2098	0,4338	0,43385	0,87	0,17354
5	23.750.000	0,2	0,5662	1,0000	0,43385	1,43	0,28677
Total	41.950.000	1					0,57473
						CG	0,43

Source: Research results, data processed

The inequality that occurs in the income group in the North Kulisusu District is due to the North Kulisusu Sub-district bordering the Kulisusu District which is the capital city of North Buton Regency which has a high level of livelihood heterogeneity and a high level of community income, causing disparities between high-income groups and low-income groups. The results of the analysis of the average income of the people of North Kulisusu District are classified as high at IDR. 1.398.333,- compared to the Regency's average income of IDR. 1.201.734,-. However, 30 percent of the income-receiving community groups in North Kulisusu District receive more than the district average, while 70 percent receive less than the district average (Adisasmita, 2006; Ardagna, 2001; Kemiskinan, 2004). This shows that there is an imbalance between the North Kulisusu sub-district and the North Buton district.

- Gini ratio analysis in West Kulisusu District
  The people of the West Kulisusu sub-district have varied livelihoods, where the population is more dependent on the agricultural and fishery sectors for their livelihoods. But some workers in the private sector, traders, and others. The results of the Gini Ratio analysis show that the income distribution of the West Kulisusu sub-district is relatively even, with a Gini coefficient of 0.24. The results of the Gini Ratio analysis for the West Kulisusu district can be seen in Table 5.

Table 5
Results of Gini analysis in West Kulisusu District in 2019

	Yi	f %	(yi)	Y*	Y* -1	Y* + Yi*-1	fi(Y* + Yi*-1)
1	2.150.000	0,2	0,0825	0,0825	0	0,08	0,01649
2	2.950.000	0,2	0,1132	0,1956	0,08247	0,28	0,05562
3	4.746.000	0,2	0,1820	0,3777	0,19562	0,57	0,11466
4	6.535.000	0,2	0,2507	0,6283	0,62832	1,26	0,25133
5	9.690.000	0,2	0,3717	1,0000	0,62832	1,63	0,32566
Total	26.071.000	1					0,76376
						CG	0,24

Source: Research results, data processed

Table 5 above shows the Gini coefficient of the income distribution of the people of West Kulisusu District relatively evenly with a Gini coefficient of 0.24. If you look at the average income of the people of West Kulisusu District, it is very low at IDR. 869,033,-. compared to the district's average income of IDR 1,201,734. The results of the analysis show that as many as 83.33 percent of the income recipients of the West Kulisusu District earn less than the district average income, and only 16.67 people have incomes that are more than the district average income. This means that there is a very large disparity between the income of the people of the West Kulisusu sub-district and the income of the people of the North Buton Regency as a whole (Friedmann & Alonso, 1964; Manurung, 2009; King & Levine, 1994).

- Gini ratio analysis Bonegunu District

  The results of the Gini Ratio analysis show that the income distribution of the people of Bonegunu District is relatively even with a Gini coefficient of 0.29. The results of the analysis can be seen in Table 6.

Table 6
Results of Gini coefficient analysis in Bonegunu District in 2019

	Yi	f %	(yi)	Y*	Y* -1	Y* + Yi*-1	fi(Y* + Yi*-1)
1	2.800.000	0,2	0,0767	0,0767	0	0,08	0,01534
2	3.700.000	0,2	0,1014	0,1781	0,07670	0,25	0,05095
3	4.755.000	0,2	0,1303	0,3083	0,17806	0,49	0,09727
4	9.750.000	0,2	0,2671	0,5754	0,57540	1,15	0,23016
5	15.500.000	0,2	0,4246	1,0000	0,57540	1,58	0,31508
Total	36.505.000	1					0,70881
						CG	0,29

Source: Research results, data processed

Table 6 shows the results of the Gini Ratio analysis in Bonegunu District, where the income distribution of the community is relatively even with a Gini coefficient of 0.29. When viewed from the income distribution of Bonegunu District, 66.67 percent received income below the district average income, and 33.33 percent received income above the average income of North Buton district. The results of field observations show that income inequality in Bonegunu District occurs because the people who live in several villages are still relatively poor with traditional farmer livelihoods. This indication is seen from the ownership of the house which is still very simple, made of boards with a simple shape. Meanwhile, in some villages, the community already has permanent houses with the construction of solid concrete. The difference in the level of community income in Bonegunu District is due to differences in livelihoods and differences in the work ethic of the community.

- Analysis of Gini Ratio in Kambowa District

  The residents of Kambowa sub-district have a livelihood as farmers, fishermen, traders, private employees, civil servants, and several other micro-small businesses. The results of the Gini Ratio analysis show that the income distribution of the people of Kambowa District is relatively unequal with a Gini Ratio of 0.37. This can be seen in Table 7.

Table 7
Results of Gini Ratio analysis in Kambowa District in 2019

	Yi	f %	(yi)	Y*	Y* -1	Y* + Yi*-1	fi(Y* + Yi*-1)
1	2.510.000	0,2	0,0676	0,0676	0	0,07	0,01351
2	4.000.000	0,2	0,1077	0,1752	0,06756	0,24	0,04856
3	4.880.000	0,2	0,1314	0,3066	0,17524	0,48	0,09637
4	5.560.000	0,2	0,1497	0,4563	0,45626	0,91	0,18250
5	20.200.000	0,2	0,5437	1,0000	0,45626	1,46	0,29125
Total	37.150.000	1					0,63219
						CG	0,37

Source: Research results, data processed

The inequality that occurs in Kambowa District is caused by income disparities between groups of income recipients from seaweed farmers and cashew farmers, as well as between traders in the market and other small traders. The average income of Kambowa District is IDR. 1,238,333,- or relatively higher than the district's average income of IDR. 1.201.734,- The results of the analysis show that as many as 86.67 percent earn below the district average income, and as many as 13.23 percent receive income higher than the district average income. The difference in the average sub-district income with the district average income causes a wider gap between the sub-district and district areas.

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- Gini ratio analysis in Wakorumba District
  Based on the results of the Gini Ratio analysis, it shows that Wakorumba District has a relatively low-income inequality with a Gini Ratio of 0.32. This can be seen in Table 8.

Table 8
Results of Gini ratio analysis in Wakorumba District in 2019

	Yi	f %	(yi)	Y*	Y* -1	Y* + Yi*-1	fi(Y* + Yi*-1)
1	2.000.000	0,2	0,0802	0,0802	0	0,08	0,01604
2	3.010.000	0,2	0,1207	0,2009	0,08018	0,28	0,05621
3	3.779.167	0,2	0,1515	0,3524	0,20086	0,55	0,11065
4	5.053.333	0,2	0,2026	0,5550	0,55498	1,11	0,22199
5	11.100.000	0,2	0,4450	1,0000	0,55498	1,55	0,31100
Total	24.942.500	1					0,71588
						CG	0,32

Source: Research Results, data processed

Table 8 shows the results of the Gini Ratio analysis, where the income distribution of the people of Wakorumba District is relatively even. When viewed from the average community income is still relatively very low at IDR. 415,716,-. when compared to the average income of the North Buton district, it is almost three times as much as IDR. 1,201,734. The results of the analysis show that 76.67 percent of income recipients in Wakorumba District earn less than the district average income, while people who have incomes higher than the average income of North Buton district are 23.33 percent. This means that there is very large income inequality between the income of the people of the Wakorumba sub-district and the income of the people of the North Buton Regency as a whole. The results of in-depth interviews with respondents stated that the low income earned by the people of Wakorumba District was caused by losing their main source of livelihood from forest products that turned into protected debt. As a result, people switch their livelihoods as fishermen and traditional farmers with low-income levels.

4 Conclusion

The results of the Gini Ratio analysis show that the income distribution of the people of North Buton Regency is relatively unequal with a Gini coefficient value of 0.36. Districts with low-income inequality (a) West Kulisusu District with a Gini coefficient of 0.24 (b) and Bonegunu District with a Gini coefficient of 0.29. Districts with moderate-income inequality (a) Kulisusu District with a Gini coefficient of 0.32. (b) Wakorumba sub-district with a Gini coefficient of 0.32 and (c) Kambowa District with a Gini coefficient of 0.37. Meanwhile, sub-districts that have high-income inequality (a) North Kulisusu District have a Gini coefficient of 0.43. The dynamics of economic activity in the four sub-districts are quite high both in the agricultural sector, the handicraft industry sector, and the service sector, allowing for inequality of income distribution among the community.

The results of in-depth interviews and Focus Group Discussions (FGD) show that the factors for the occurrence of inequality in people's income both between districts and sub-districts and between sub-districts and sub-districts are: (1) Differences in natural resource potential of each sub-district. (2) Differences in ownership of production factors (land, labor, capital, and technology). (3) Differences in skill level and work ethic. (4) Differences in regional accessibility between regencies and sub-districts as well as between sub-districts and sub-districts. (5) Differences in development program interventions for each sub-district.

Recommendation

The development budget allocation strategy can encourage the acceleration of regional economic growth, as well as being a strong instrument in reducing community income inequality through the process of accumulation and mobilization of local resources in each sub-district because the diversity of resource characteristics of each sub-district is a tendency for inequality between economic sectors within a sub-district, This then becomes the cause of income inequality between communities.

Local governments need to improve the quality of human resources fairly and equitably through improving education and skills as well as empowerment and counseling, especially those who make a living as farmers, fishermen, and workers in the informal sector. Thus, people with low incomes are motivated to change their mindset, especially people who are apathetic, passive, resigned, ignorant, and dependent will try to improve their fate.

To support the acceleration of the economic development of the sub-district and village communities, it is necessary to develop regional infrastructure evenly in all sub-districts, especially the improvement of village roads, district roads, bridges, provincial roads, piers, and ports, to facilitate the flow of goods and passengers at each node of travel destinations and marketing of goods with relatively cheap transportation costs and the added value of agricultural and industrial products is increasing.

Conflict of interest statement
The authors declared that's they have no competing interests.

Statement of authorship
The authors have a responsibility for the conception and design of the study. The authors have approved the final article.

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