

An Analysis of Catchment for the Archipelagic Area within Mainland-dominated Local Government

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Abstract

This study found that there was dis-catchment in the archipelagic area within Sumenep Regency. The regency has two separated areas while the capital is located in the mainland area. Imbalanced development exists between these two areas: a more developed mainland and underdeveloped archipelago. This study was conducted at the end of 2017 in Kangean Islands that consists of three districts, Kangean, Kangean, and Sapeken. Secondary data in the form of Developing Village Index (DVI) and Village Development Index (VDI) was confirmed through interviews and observations employing a data interactive model. By combining Developing Village Index and Village Development Index, the archipelagic area fell into the category of a deprived region. The mean of the two indexes for Sumenep Regency was lower than the mean for East Java Province; lower indexes of villages within the archipelagic area contributed to this. Lower indexes represent people who live in poverty as well as poor facilities and infrastructure. Lack of governmental capacity is the main problem for public service and development administration. Separation of local government should be implemented to overcome the problem; in other words, the archipelagic area or the islands should have its own government because it has different characteristics from the mainland area.

Keywords:

archipelagic area, catchment area, imbalanced development, local government

Introduction

Dis-catchment occurs in island communities whose region is a combination of land and islands. It is common for islanders to get inadequate public services and development opportunities compared to people in the mainland. Different characteristics between land and islands often make it difficult to achieve equal public services. Land-based public services tend to ignore the needs of the island community that finally leads to dis-catchment. This situation creates an acute imbalance of public services and development between the

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mainland and the archipelago, in which the islanders cannot catch up with the progress of the mainland community; this is a big problem for the welfare of the community living in islands. This imbalance can be clearly seen from the different levels of welfare and independence of villages in the mainland and archipelago.

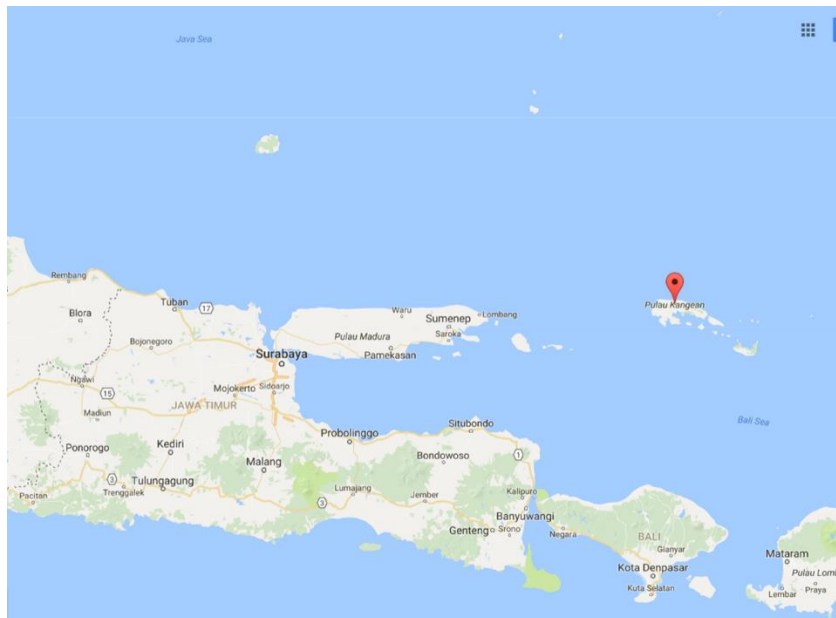
There has not been much research on catchment areas. Specifically, there has not been any catchment area study for a region covering both the mainland and archipelago whose population mainly lives in the mainland area. The catchment area that was originally conceived by Leemans (1970) uses the geographical concept to assess the coverage of public service areas. This concept is then explained in more detail by Muttalib and Khan (1982) to explain the scope of local government public service areas. Most of the catchment area studies have always been on certain types of services such as those generally related to health and education services (Primasari, 2014; Shah, Bell, & Wilson, 2016). It is rare that general research on catchment areas studies all local government services (Jenkins and Campbell, 1996; Ajwad & Wodon, 2007). Research on catchment areas specifically on the islands as a part controlled mainly by the mainland is even rarer. The research of Madubun *et al.* (2017) is specific about islands. This condition shows the scarcity of research on catchment areas and the opposite condition, namely dis-catchment areas in an archipelago that is part of a region dominated by land.

Indonesia is an archipelago. A region in Indonesia may only be land, or only islands, or a combination of both. Sumenep Regency is an area with a combination of land and islands dominated by the ocean with four islands grouping (Masa Lembu, Sapudi, Kangean, and Gili Genting). Sumenep has 126 islands, with a land area of about 45% of the total land area of the regency (BPS: Kabupaten Sumenep Dalam Angka 2017). The center of its regional government is also on the mainland. The majority of the people of Sumenep Regency live on the easternmost mainland of Madura Island. Although 27% of the population lives in the archipelago, inequality exists with 34% of pre-prosperous households living in the islands. The administrative area of Sumenep Regency is divided into 27 districts with 9 districts in the islands and 18 districts on the mainland. There are 334 villages throughout the regency. Of the 103 underdeveloped villages in Sumenep Regency in 2015, almost half were in the archipelago. Of the 11 highly disadvantaged villages, all were in the archipelago. The situation

above shows that the people of the archipelago in Sumenep Regency are left behind in terms of welfare compared to the people who live on the mainland.

Welfare inequality between people living in the mainland and the archipelago needs to be proven in a study. The results of the study can be used to understand the underdevelopment of the island communities to prepare solutions to the problem so the people who live in the islands can get public services equivalent to those received by the mainland communities of Sumenep. This study was conducted in a group of islands located at the far end in the easternmost area of Sumenep Regency known as Kangean Islands, which consist of three districts, namely Kangean, Kangayan, and Sapeken District. These islands are located in the north of the eastern part of Bali. The underdeveloped and very underdeveloped villages exist in this part of Sumenep Regency and this represents the backwardness of the archipelago. This study compared data from Village Development Index (VDI) and Developing Village Index (DVI) supplemented with observations of underdeveloped and very underdeveloped villages.

Picture 1.
Location of Kangean Islands of Sumenep Regency, East Java Province



Source: Google Map, viewed 25 May 2017, 15:40:20.

Literature Review

Catchment Area

The catchment area theory was originally built by Leemans (1970); this theory is basically related to the efficiency of public services held in an area. An exact measurement is needed between the reach of public services and the size of the community in terms of both the number and distribution of their dwellings. Each type of public service has a different range of services. Primary school education services cover a narrower scope of an area than secondary school education services do, so it is natural that certain types of services are handled by different levels of government. The importance of this theory needs to be considered when determining (1) who will carry out certain public services, in which the greater the need for service coverage, the higher the level of government that organizes it; and (2) the size of the catchment area because it also determines the area and boundaries of a local government. Territorial boundaries are important because they relate to the scope of services and the number and distribution of residents served. The right size will guarantee the efficiency of public services that satisfaction and effectiveness of public services can be properly optimized. The two brings consequence to regional planning and development and coordination between intra-autonomous and inter-autonomous local government and between the central government (or supra-regional government) and the local government.

Muttalib and Khan (1982) have shown two different tendencies regarding the determination of regional boundaries. The first is determining boundaries based on tradition and history and the second is based on connectivity that is influenced by communication and transportation factors. When it comes to the efficiency and effectiveness of public services, the first method is considered obsolete, while the second method is considered to increase the significance. Furthermore, Muttalib and Khan (1982) also revealed that regional boundaries can be determined based on three approaches: quantitative standards, socio-economic and physical standards, and public service standards. Quantitative standards include consideration of population numbers, span of control, and administrative convenience. Socio-economic and physical standards include consideration of geographical, demographic, economic, and cultural factors. Geographical factors are the biggest consideration in this approach because they are considered to influence other factors. Geographical barriers often

form localization, which is an important element for local government. If the autonomous region is too large, it can eliminate the local meaning because the local community does not have a feeling for the locality due to the geographical bulkhead. Public service standards link two concepts, region and service; these two things are closely related because there are limits to the reach of public services. The capacity of public services leads to the need to determine regional boundaries. A too-small regional boundary will cause inefficient public services, while a too-large regional boundary will create ineffective public services. The difficulty lies in the uniqueness of each public service that has a different service area. Therefore, local government creation and amalgamation is a situational need.

B.C. Smith (1985) has revealed that the determination of boundaries (delimitation) of an area is very important for the effectiveness of government for both local and national government. Determination of boundaries of an area can be done by considering five things: community, efficiency principles, managerial convenience, technical factors, and social principle. Community factors consider the scale of locality, community hierarchy, and social geography. Efficiency principles are needed to produce efficient public services for every level of government. Managerial convenience considers the proper organizational structure within a decentralized framework in the broadest sense to facilitate the achievement of government objectives. Technical factors are also important because they involve the optimal administration of government, which is influenced by location and geography, including climate and topography. Social principles present considerations that are more accommodating to people's feelings than rational calculations. The social principles consider aspects of language, ethnicity, history, and a combination of all; this gives a feeling of locality to the community. The social principles also consider the aspect of 'feeling local' of the concept of local government.

A study conducted by Jenkins and Campbell (1996) has shown that there is a negative relationship (inverse relation) between service quality and catchment area sizes. The study in the health services sector in London included variables of health care workers, the community served, and the health service area. The negative relationship means the greater the catchment area size, the smaller the quality of service would be. This study in urban areas shows that there is an influence between the geographical location of the population and the place of

service with accessibility to the services provided. The wider the service area, the smaller the community's accessibility to the service would be.

Meligrana (2004) has confirmed the need to properly restructure regional boundaries. Appropriate boundaries will improve the quality of local government able to meet the preferences and needs of the local community. Geographically, the problem of boundaries of local government can be divided into two that are overbound or underbound. Overbound means the capacity of regional governments in providing public services exceeds the boundaries of their regions. The result is that local government services also include people who are outside the jurisdiction. Underbound means the capacity of local governments to provide public services is less than the boundaries they have, so many people who live within their boundaries are not well served. To overcome this, redrawing local government boundaries is needed in the forms of annexation, amalgamation, and separation or creation of new local government.

A study conducted by Ajwad and Wodon (2007) distinguishes cross-regional government services between poor and non-poor regions. This study was conducted in Bolivia for education and infrastructure. Good public services in non-poor areas were not profitable for people who are in poor areas. People in poor areas could not have adequate access to services in non-poor areas. Greater funding for public services in non-poor areas increased inequality between regions. The proposal given by Ajwad and Wodon is that government funding should be greater given to public services in poor areas, while non-poor areas must be charged to the services provided.

The relationship between the capacity of local government and regional boundaries produces two categories, namely catchment and dis-catchment area (Muluk, 2009). Catchment area means that public services provided by service providers can fully reach the public who are within the boundaries of the service work area, while the dis-catchment area means the opposite—public service providers cannot reach all people who are within the boundaries of the service area. The dis-catchment area indicates an error in determining the boundary area; this causes inefficient and ineffective services that it can cause vulnerability in social life such as criminality, poor public services, underdevelopment, high-cost economy, slow bureaucracy, and so forth.

A study conducted by Primasari (2014) in three districts isolated from the local government of Malang showed a dis-catchment area in health services. This dis-catchment area was marked by the inefficiency and ineffectiveness of health services for the community. A broad geographical condition with topography in the form of mountains that is far from the center of government is the cause of the dis-catchment area. Dis-catchment areas occur because of an imbalance between the capacity of public service providers and the large burden of public services. This imbalance is exacerbated by the geographical difficulties surrounding the population and places of public service.

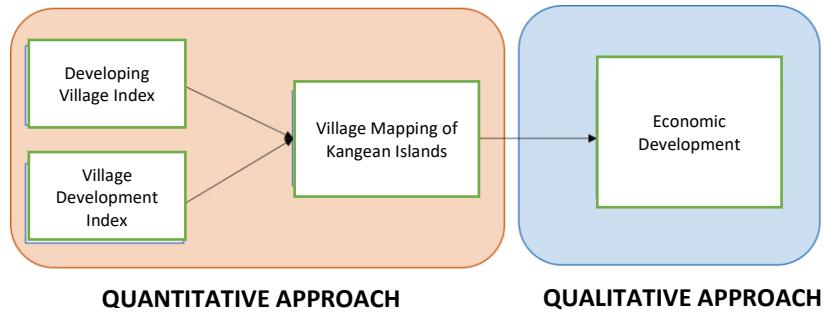
Shah, Bell, and Wilson (2016) conducted a study on catchment areas related to the effect of urban area accessibility on the quality of public health services of the local government in Canada. They concluded that the quality of health for people in geographical accessibility to health services was better than the quality of health of those outside of the reach of health services. The people living in geographical ranges outside of the catchment area got a poorer quality of health services.

A study by Madubun, Akib, and Jasrudin (2017) conveyed the situation of dis-catchment areas in three districts in City of Tual, Maluku Province. Geographically, the study site is in the archipelago. Public services could not reach the catchment area because difficulties existed in terms of both public service providers unable to reach the communities they served and areas that required special attention. There was an imbalance between service provider institutions and the people served because of the geographical factors of the islands. Weaknesses in terms of service providers included three things. The first was the lack of authority given by the Mayor. The second was regional difficulties such as the geographical form of the islands, which were not supported by adequate transportation facilities. The third was the lack of public service provider resources, including human resources, funds, and facilities.

Methods

This study was conducted at the end of 2017. This study used a combination of quantitative and qualitative research with the quantitative method became the dominant method. Quadrant analysis was performed on VDI and DVI data available in 2017 with the aim of describing the condition of villages in Kangean Islands.

Figure 1.
Research Framework



Source: Analyzed by the researcher

Based on the description above in the quantitative approach, the researcher focused on the condition of VDI and DVI of villages in Kangean Islands. The analysis of VDI and DVI began by finding the mean values of VDI and DVI of Sumenep Regency and Kangean Islands. Then the analysis was presented in the form of a quadrant, with interpretation of the assessment as follows:

- Quadrant I : VDI and DVI are above the average
- Quadrant II : VDI is above the average and DVI is weak
- Quadrant III : DVI is above the average and VDI is weak
- Quadrant IV : DVI and VDI are below the average

The mean value of each level was obtained from the average value of DVI and VDI. Because DVI and VDI have different intervals, the DVI value is multiplied by 100. Table 1 and 2 presents the mean values for Sumenep and Kangean Islands.

Table 1.
DVI and VDI Scores for Sumenep Regency

Village Instrument	Average
	Suemenep Regency
DVI	0.605
Convert DVI (x 100)	60.5
VDI	60.334

Source: Research Result

Table 2.
DVI and VDI Scores for Kangean Islands

District/ Villages	DVI	VDI	District/ Villages	DVI	VDI
Arjasa	0.582	54.459	Sapeken	0.512	55.332
Buddi	0.426	34.74	Sabuntan	0.476	54.18
Gelaman	0.568	44.82	Paliat	0.480	52.08
Pajenangger	0.539	60.60	Sapeken	0.615	57.06
Sawahsumur	0.485	43.84	Sasiil	0.480	51.56
Paseraman	0.613	54.42	Sepanjang	0.490	54.59
Kalinganyar	0.551	48.36	Tanjungkiaok	0.517	58.83
Arjasa	0.644	72.71	Pagerungan Kecil	0.498	56.12
Duko	0.630	62.22	Pagerungan Besar	0.544	58.42
Kolo Kolo	0.547	52.75	Sakala	0.507	55.15
Angkatan	0.633	63.99	Kangayan	0.519	52.167
Kalisangka	0.580	54.43	Saobi	0.553	61.97
Laok Jangjang	0.627	57.06	Kangayan	0.602	64.22
Bilis Bilis	0.612	52.14	Torjek	0.540	65.14
Sumberangka	0.595	53.06	Cangkraman	0.466	40.62
Kalikatak	0.643	67.13	Tembayangan	0.440	45.40
Angon Angon	0.584	56.53	Batuputih	0.444	35.88
Sambakati	0.604	53.61	Daandung	0.556	53.93
Pandeman	0.608	55.22	Timur Jangjang	0.540	62.01
Pabian	0.576	47.09	Jukong Jukong	0.534	40.33

Source: Research Result

Furthermore, the qualitative approach was carried out by conducting observations and interviews directly to the informants in Kangean Islands: Arjasa, Kangayan and Sapeken District. Data were analyzed using the Interactive Data Analysis Model from Miles, Huberman, and Saldana (2014).

Data Presentation

1. Mapping of DVI and VDI of Villages in Kangean Islands Based on the Average of Sumenep Regency

Village classification was done in the Old and New Order Era; the classification was *Swadaya* (self-supporting) Village, *Swakarya* (self-developing) Village, and *Swasembada* (self-sufficient) Village. As the New Order Era collapsed, that classification was no longer used. Currently, two ministries issue different village indices—the Ministry of Villages, Development of Disadvantaged Regions, and Transmigration issued the Developing Village Index (DVI), while the Ministry of National Development Planning created the Village

Development Index (VDI). The two indices are different in three (3) ways: village classification, dimensions in measuring the index, and the ratio of scores used.

The Developing Village Index (DVI) was developed to strengthen efforts to achieve village and rural area development targets as stated in the 2015-2019 National Medium-Term Development Plan (RPJMN, 2015-2019). The goal is to reduce the number of underdeveloped villages, with a target of 5000 villages, and to increase 2000 the number of independent villages in 2019. DVI is an index that classifies villages based on their status. DVI is useful not only to know the development status of each village, which is closely related to its characteristics but also to be developed as an instrument or reference in achieving the 2015-2019 targets and in making strategic policies at the village level. Therefore, DVI was developed to reach all dimensions of a village including social, economic, and ecological, without removing political, cultural, historical, and local wisdom powers. The three dimensions are the ways to sustainable village development that is closely related to the values, culture, and characteristics of a village.

DVI divides villages into five categories, namely (i) *Desa Sangat Tertinggal* (Very Underdeveloped Villages), (ii) *Desa Tertinggal* (Underdeveloped Villages), (iii) *Desa Berkembang* (Developing Villages), (iv) *Desa Maju* (Developed Village); and (v) *Desa Mandiri* (Independent Village). DVI classifies village values in a ratio of 0-1. The classification shows the diversity of characters of each village represented by a range of scores from 0.27 to 0.92. The classification also helps in determining the status of village development and in giving recommendations for necessary policy interventions.

The score for each classification of the village development level is presented in Table 3.

Table 3.
Village Categories Based on DVI

Category	Score
Very Underdeveloped Villages	≤ 0.491
Underdeveloped Villages	> 0.491 and ≤ 0.599
Developing Villages	> 0.599 and ≤ 0.707
Developed Villages	> 0.707 and ≤ 0.815
Independent Village	> 0.815

Source: Kementerian Desa, Pembangunan Daerah Tertinggal, dan Transmigrasi, 2015.

DVI was prepared by taking into account the availability of data from Village Potential, published by the Central Bureau of Statistics. For the calculation of DVI a certain year n , *Potensi Desa* (PODES) or Village Potential data in year $n-1$ is used. DVI is a composite index constructed from social, economic, and cultural dimensions. Here are the index scores per variable:

$$\text{Variable of the Index} = \frac{\sum \text{Indicator } X}{\text{Maximum Score } (X)}$$

From the value of variables in the index, arithmetic averages are used to obtain the following values $\text{DVI} = 1/3 (\text{IS} + \text{IE} + \text{IL})$.

The other index, the Village Development Index (VDI), is a measurement arranged according to the level of village development in Indonesia with 'village' as its unit of analysis. VDI is a village specific measurement, which was built from (a) the census data of PODES or Village Potential in 2014 issued by the Central Bureau of Statistics and used as a reference for the main indicators in the index; and (b) data on the government administration area (Regulation of the Ministry of Home Affairs Number 39, 2015) which is used as a standard reference for the number of registered villages in Indonesia. In formulating the concept and method of measurement, VDI considers the specific problems of villages in Indonesia.

The purpose of the village classification based on VDI is explained in the 2015-2019 National Medium-Term Development Plan, which includes (a) mapping the conditions of villages in Indonesia, based on their level of development; (b) setting the development targets to be achieved by village development actors in the next five years; and (c) capturing village development performance. In addition, VDI is expected to provide a number of benefits. First, it provides important data that can be used as a reference or literature related to the level of village development in Indonesia currently. Second, it is useful for village development planning at the central level (ministries or institutions), provincial level (the Development Planning Agencies and work units related to village development), regency or municipality level, and village level. Third, VDI is useful for monitoring and evaluating the results of the village development program to evaluate the match between the programs implemented with the needs of the village—whether the program can encourage an increase in the status of the village.

VDI was built based on the 2014 Village Potential Income data (Kementerian Perencanaan Pembangunan Nasional, 2014). VDI has five (5) dimensions of (1) Basic Services, (2) Infrastructure Conditions, (3) Accessibility or Transportation, (4) Public Services, and (5) Government Administration. VDI is structured to show the level of development in a village with a range of scores from 0 to 100. To facilitate interpretation, villages are put into three (3) categories namely *Desa Mandiri* or Independent Village, *Desa Maju* or Developed Village, and *Desa Tertinggal* or Disadvantaged Village.

An Independent Village is a village that has sufficient availability and access to basic services, adequate infrastructure, easy accessibility or transportation, good public services, and good government administration. Technically, an Independent Village is a village with a VDI score of more than 75. A Developing Village is a village that has sufficient availability and access to basic services, infrastructure, accessibility or transportation, public services, and government administration. Technically, a Developing Village scores more than 50 for VDI but less than or equal to 75. The last classification, a Disadvantaged Village, refers to a village that has minimal availability and access to basic services, infrastructure, accessibility or transportation, public services, and government administration. Technically, a Disadvantaged Village has a VDI score of less than or equal to 50.

The DVI and VDI scores of Sumenep Regency were obtained from the average scores of all the villages in Sumenep Regency. The following table shows the comparison of the average DVI and VDI scores of Sumenep Regency.

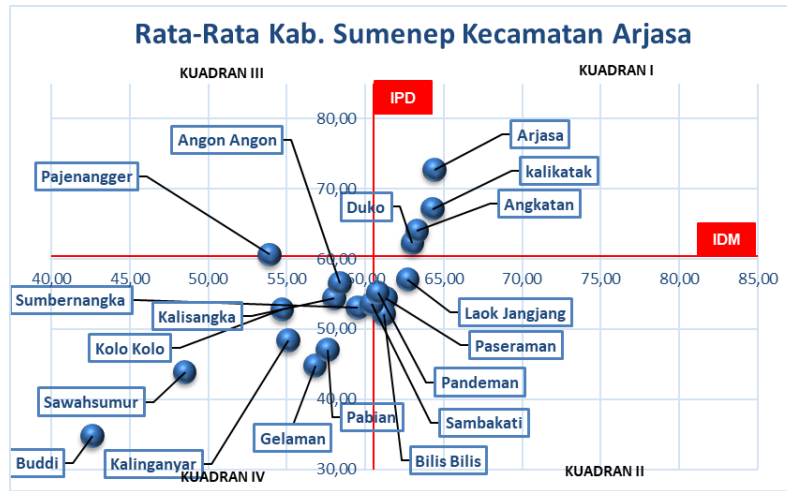
Table 4.
DVI and VDI of Sumenep Regency

Village Instrument	Average Sumenep Regency
DVI	0.605
VDI	60.334

Source: Analyzed by the researcher

The following are the DVI and DVI scores of villages in Arjasa District and village map quadrants based on averages of Sumenep Regency.

Figure 2.
DVI and VDI Quadrants of Villages in Arjasa District against the Average Score of Villages in Sumenep Regency



Source: Analyzed by the researcher

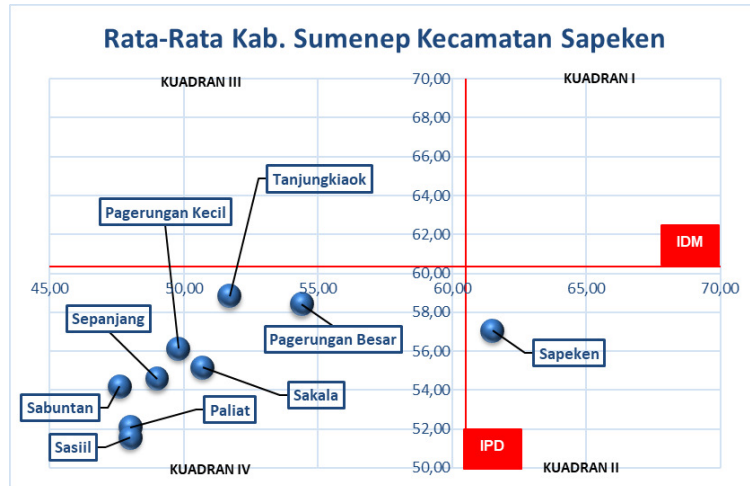
Figure 2 shows the mapping of scores of villages in Arjasa District against the average DVI and VDI scores of villages in Sumenep Regency. Of the 18 villages in Arjasa District, four (4) were included in Quadrant I meaning that these villages had a score above the average of other villages in Sumenep Regency. The four (4) villages were Arjasa Village, Kalikatak Village, Angkatan Village, and Duko Village.

Another four (4) villages were in Quadrant II meaning that the villages had a DVI score above the average DVI score of villages in Sumenep Regency and VDI score below the average VDI score of villages in Sumenep Regency. The four (4) villages were Paseraman Village, Laok Jangjang Village, Bilis Bilis Village, and Pandeman Village. Only one (1) village fell in Quadrant III, Pajenangger Village; it means the village had a DVI score below the average DVI score of villages in Sumenep Regency and a VDI score above the VDI score of villages in Sumenep Regency.

The remaining eight (8) out of 18 villages belonged to Quadrant IV meaning that they had a VDI and DVI score below the average score of villages in Sumenep Regency. The conclusion was that the majority of villages in Arjasa District were still underdeveloped compared to other villages in Sumenep Regency.

The following Figure 3 shows the DVI and VDI scores of villages in Sapeken District against the average DVI and VDI scores of villages in Sumenep Regency.

Figure 3.
DVI and VDI Quadrants of Villages in Sapeken District against the Average Score of Villages in Sumenep Regency



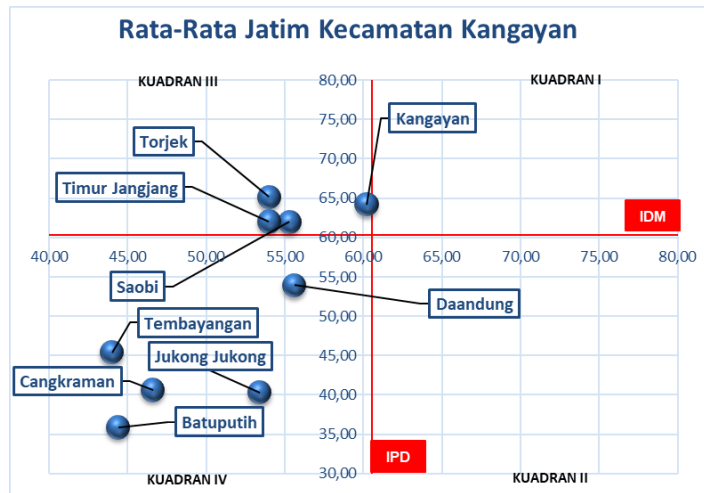
Source: Analyzed by the researcher

Figure 2 shows the mapping of scores of villages in Sapeken District against the average DVI and VDI scores of villages in Sumenep Regency. From the four (4) quadrants, it appears that only two (2) were filled, namely Quadrant II and Quadrant IV. In total, from the nine (9) villages in Sapeken District, none was included in Quadrant I meaning that all villages in Sapeken District had VDI and DVI scores below the average score of villages in Sumenep Regency.

From the nine (9) villages in Sapeken District, one (1) was included in Quadrant III, Sapeken Village; this means that Sapeken Village had a VDI score below the average scores of villages in Sumenep Regency and a DVI score above the average scores of villages in Sumenep Regency average. Sapeken Village is the capital of Sapeken District. The remaining eight (8) villages were included in Quadrant IV meaning that the majority of villages in Sapeken District had VDI and DVI scores lower than the scores of villages in Suemenep Regency.

The last district is Kangayan District whose VDI and DVI scores are illustrated in Figure 4 as follows.

Figure 4.
DVI and VDI Quadrants of Villages in Kangayan District against the Average Score of Villages in Sumenep Regency



Source: Analyzed by the researcher

The nine (9) villages in Kangayan District fell into Quadrant III and Quadrant IV. Quadrant III held four (4) villages including Saobi Village, Kangayan Village, Torjek Village, and Timur Jangjang Village; these villages had DVI scores below the average of DVI scores of villages in Sumenep Regency and VDI scores above the average of VDI scores of villages in Sumenep Regency.

Five (5) other villages namely Cangkraman Village, Tembayan Village, Batuputih Village, Daandung Village, and Jukong-Jukong Village were included in Quadrant IV; they had VDI and DVI scores below the average score of villages in Sumenep Regency. These records show that more than half of villages in Kangayan District had below-average scores of DVI and VDI.

The above data as a whole illustrate disparity between villages in Sumenep Regency and villages in Kangean Islands. In total, only four (4) villages out of 37 villages in the Kangean Islands were included in Quadrant I or had above the average DVI and VDI scores compared to villages in Sumenep Regency. The remaining 23 were included in Quadrant IV meaning that they had scores below the average VDI and DVI. The rest five (5) villages were in Quadrant III and the other five (5) villages were in Quadrant II.

2. Description of Economic Development

In general, the empirical condition of Kangean Islands illustrated through the DVI and VDI analysis in the previous discussion confirmed that the majority of villages in Kangean Islands were in Quadrant IV. This shows the very high gap between the archipelagic areas or islands and the mainland. This analysis will be complemented by describing economic development (Triutomo, 2001). Description include several aspects such as: local resources, market, workforce, investment, government capability, transportation and communication, and technology. Description includes three districts in Kangean Islands: Arjasa, Kangayan, and Sapeken. The followings are empirical findings in the field.

Local and natural resources are potentials of an area to be developed. Agriculture is the excellent potential of Sapeken District, Arjasa District, and Kangayan District with rice and corn as their main commodity. However, the fact that the fields are rainfed somehow hinders the development of the sector. As the areas rely on agriculture as the leading sector, irrigation is certainly an important issue. The following is a picture of agriculture land in Kangean Islands.

Picture 2.
Agricultural Fields during the Dry Season in Kangean Islands



Source: Personal documentation of the researcher

Other leading sectors in Kangean Islands are the livestock, marine fisheries, and aquaculture. For example, the biggest potential for animal husbandry in Kangean Islands is in Arjasa District. Recorded from a total of 18 villages, cattle population reached 11,335 and

buffaloes reached 3,913 in 2014. The population was increasing until it was estimated to reach more than 16,000 livestock in 2017.

The next thing to consider is the market where the public can sell their products for economic turnover; this is an important factor in regional development. In Kangean Islands, the market can only be found in the capital district. For example in Arjasa District, the market is only found in Arjasa Village. There is no market in Pajenangger Village although it has quite potential, especially in the aquaculture, marine fisheries, agriculture, and livestock sectors. Going to the market in Arjasa takes approximately 1.5 hours by road. This even gets longer during the rainy season due to the bad road condition. This is certainly an obstacle to regional development.

The workforce also plays an important role in managing resources in the region. Abundant natural resources in Kangean Islands are the oil and gas sector managed by PERTAMINA (The state-owned oil and natural gas company). Nevertheless, the large potential of oil and gas in Kangean Islands is not directly proportional to the development of the islands and the welfare of the people. The majority of workers in the oil and gas sector are outsiders, whereas the local people rely on the agriculture, livestock, and fisheries sectors. Workforce quality cannot be separated from the existence of educational infrastructure. In general, Kangean Islands has had play groups, kindergartens, elementary schools, middle schools, and high schools. The problem, however, is on distribution of schools and the low number of high schools. According to the potential of the islands, the people surely need a vocational school in agriculture, animal husbandry, and fisheries.

Another important factor in regional development is good situation to attract investors to invest. Up to the present time, there have been no investors investing on agriculture, animal husbandry, and fisheries due to some barriers such as poor access, low-security guarantee, difficulty to get water sources for the agricultural sector, and limited logistics delivery from mainland to the islands and the vice versa. However, the people of Pajenangger Village have worked closely with investors, especially in the energy sector or electricity supply since Kangean Islands have not been 100% electrified by *Perusahaan Listrik Negara* (State-owned Electricity Company); even Arjasa Village only got electricity service half day.

The ability of the government to direct regional development also crucial for regional development; the government is a catalyst for development. However, even as having large

potential for oil and natural gas and the Sumenep Regency government received much from the sector, the people of Kangean Islands have not received what they deserve. The large potential of oil and gas in Kangean Islands is not directly proportional to the development in the area, as proven by the results of DVI and VDI. As many as 23 out of 37 villages in Kangean Islands were in Quadrant IV, meaning that than 60% of the villages in Kangean Islands had a DVI and VDI score below the average score of other villages in Sumenep mainland. This confirms the very high level of development disparity between the mainland and the archipelagic area of Sumenep. It is alarming that the government of Sumenep Regency receives a substantial share of the oil and gas sector from Kangean Islands, but it is not directed to develop Kangean Islands.

The next most important factor is transportation and communication since the two play a role in building interaction between regions. Poor transportation and communication will certainly hamper the development of a region. The region is composed of several islands and some areas cannot be accessed using a four-wheeled vehicle; things get even worse in the rainy season. The following is a picture of roads linking villages in Kangean Islands.

Picture 3.
Roads Linking Villages in Kangean Islands



Source: Personal documentation of the researcher

The poor condition of roads between villages in Kangean Islands is certainly one of the factors inhibiting regional development. Communication, especially wireless communication, is also minimal. In some areas, people even have to install a five-meter high

antenna, or even more, to collect the communication signal. The worse the mobility and communication, the higher the cost people pay. Following up on this, the territorial policy of the islands must be directed to minimize distance, facilitate accessibility, and create equitable communication networks.

The last factor is the availability of technology to process regional resources into production output. The agriculture, animal husbandry, and fisheries sectors in Kangean Islands still use conventional methods, like irrigation that relies completely on rainwater. Drilling wells and technology engineering are considered a waste as they cost too much money for the community to afford.

Thus, the government and third parties must take their role to encourage the locals to use the appropriate technology. As a simple example, the use of solar panels should be an alternative amid the problems of electrical energy that cannot reach all areas. Increasing human capacity, especially the people of Kangean Islands, is also an option that must be taken in the use of technology.

Discussion

The presentation of the data above shows the situation of the dis-catchment area occurring in the archipelagic area of Sumenep Regency, which is centered on the mainland. The presentation supports the findings of research conducted by Nur (2008) in Wakatobi, and Madubun, Akib, and Jasrudin (2017) in Maluku. This situation proves that two different regional characteristics of an autonomous region will result in a dis-catchment area for distant regions and for those with different characteristics from the central region of the local government. Dis-catchment area occurs when the ideal size of the catchment area in an autonomous region is not achieved, as stated by A.F. Leemans (1970). Dis-catchment area is characterized by differences in the quality and variety of public services received by people from two regions with different characteristics. Two different regions in one local government management also prove the relationship between the size of the region and the quality of public services as stated by Jenkins & Campbell (1996), Primasari, Supriyono, Muluk & Noor (2014) and Shah, Bell & Wilson (2016). These differences in public services also affect different regional development allocations. In the end, these differences make a difference to people's welfare, or in other words, there is economic imbalance (Makagansa, 2008). This research

proves that the management of two regions with different characteristics in one local government will result in the occurrence of dis-catchment area for regions that are separated from the central part of the local government. These two different regions are too big for one local government capacity as stated by Muttalib & Khan (1982) and Smith (1985), which results in the occurrence of dis-catchment area.

For the autonomous region itself, this dis-catchment area indicates an underbound situation in the delimitation of boundaries of local government as expressed by Meligrana (2004). This situation can be overcome by separating the deprived area into a new autonomous region. This strategy called as redrawing local government boundaries (Meligrana, 2004). It will enable the region to form local government that focuses on specific community and regional characteristics, so as to be able to manage local voice and choice more effectively. In order to produce an effective local voice, a regional scale that meets the requirements of effectiveness of democracy is needed. In addition, in order to produce an effective local choice, a region size that meets economic efficiency considerations is needed (Norton, 1994). The right size of the region is referred to as right-bound. The right size of the region and the characteristics of the area that matches the social life and physical environment in which the community lives will further increase the effectiveness of local government. This is due to the better relationship between the people and their place. Good relationship between people and place will increase the dignity of the people (Holloway & Hubbard, 2001).

Moreover, the under-bound situation can also be overcome by increasing the capacity of the government assigned to the deprived area. Of course, this method is seen to be detrimental to public services and development in benefited regions because there will be a significant division of local government capacity. If so far the region has enjoyed many preferences, the capacity will be reduced by dividing it to the deprived regions. Politically, it will also carry a big risk if the benefited region has a great influence for general and mayoral elections. Therefore, this second alternative is less effective than the first one.

Conclusions

The mapping scores of villages in Sumenep Regency are 0.605 for DVI and 60.333 for VDI; this shows the DVI and VDI scores of Sumenep Regency are below the East Java Province VDI and DVI scores reaching 0.634 for DVI and 64.54 for VDI. The results VDI and DVI of

villages in Kangean Islands was alarming since 23 out of 37 villages in Kangean Islands were in Quadrant IV, showing that the majority of villages in Kangean Islands had DVI and VDI scores below the average scores of villages in Sumenep Regency. The results confirmed that disparity between the mainland area (Madura Island) and the other islands, especially Kangean Islands. It was also unfortunate that the large potential of oil and natural gas in Kangean Islands was not able to significantly increase and accelerate development of the region when the revenue sharing obtained by Sumenep Regency was quite high.

Findings through the qualitative approach were directly proportional related to the DVI and VDI of villages in Kangean Islands against the average DVI and VDI of villages in Sumenep Regency. Kangean Islands had had not met the seven factors of regional development; yet, three (3) needs to be highlighted, namely the ability of the government, local resources, transportation and communication, and technology. (a) The ability of the government means the government must be able to direct development in Kangean Islands related to the large contribution of the oil and gas sector of the islands to the regional revenue of Sumenep Regency. In addition, the government focuses on equity. (b) Local resources and technology are interrelated. Kangean Islands actually have quite a good potential, especially agriculture, animal husbandry, and fisheries. The integration of appropriate technologies, especially those that support leading sectors, will provide leverage to the development of Kangean Islands. Technological development must also be supported by adequate human or community resources and improvement of capacity building, especially education. (c) The two points above will not be optimal as long as accessibility and communication are still limited. Improving access and enhancing communication networks is absolutely a top priority. It is also necessary to improve access services from Kangean Islands to mainland of Sumenep Regency, and the vice versa, particularly the distribution of logistics goods.

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