

Factors Affecting Land Use Change of Minapolitan Area in Sedati Districts, Sidoarjo Regency.

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Abstract--- Sedati District is one of the areas in Sidoarjo Regency that has a high potential in the aquaculture sector. Based on the Decision of Sidoarjo Regent, Sedati District was established to be one of the development areas of Minapolitan area and included as a small urban area. Based on the current condition, the existence of minapolitan area is getting shifted due to the transfer of land function into various new activity areas which is the impact of regional development. This is evident from the change of land use from agriculture to housing with an area of 89.86% of total land use change, pond land reclamation, and etc. The purpose of this research is to know the factors that influence the change of land use in an effort to maintain the existence of the minapolitan area.

Keywords—minapolitan area, land use change, land use change control

I. INTRODUCTION

Sedati Sub-district is one of the development area of Minapolitan area as stated in the Decree of the Sidoarjo Regent Number: 188/1641 / 404.1.3.2 / 2010 concerning Central of Agropolitan and Minapolitan Area in Sidoarjo Regency and Number: 188/1613 / 404.1.3.2 / 2010 about Group Agropolitan and Minapolitan of Sidoarjo Regency. In addition, based on the Regional Regulation of Sidoarjo Regency Number 6 in 2009 on Spatial Planning of Sidoarjo Regency in 2009-2029, Sedati District is included as a small urban area which is characterized by the criteria of urban areas with plans for the establishment of urban settlement area of 2,610.19 Ha. Besides, it is also designated as one of the strategic areas and as the regional development sub unit I (SSWP I) in Sidoarjo regency with the main function of local, regional and international settlement, industry and trade. Based on the results of research from Saputro (2009) in his research which states that the change of land use in Sedati District is the biggest change of land use from agriculture to housing with an area of 10,496,865,74 m² or 89,86% from total land use change. Also supported by Yuanita (2012) in his research mentioned that Sedati District has experienced deviation of function shift from pond land cover and vacant land to housing and educational facilities.

II. LITERATURE REVIEW

2.1. Sustainable Development

Sustainable development by Strange and Bayley (2008) essentially is to consider the three pillars of social, economic and environmental together and balanced, where all actions in these three aspects must be interconnected. The synergy of these three aspects is also expressed by Budimanta in Bunga Rampai Pembangunan Kota Indonesia in the 21st Century (2005), where in sustainable development, there is a need for a systematic and planned way of viewing activities in the framework of improving the welfare, quality of life and environment of humanity without reducing access and opportunities in future generations to enjoy and use them. And in its goal to create sustainable development must be based on several pillars as a major consideration, namely from the social, economic, environmental, and institutional dimensions. Therefore, based on the study of sustainable development, this research uses the pillar / aspect as described previously consisting of social, economic, environmental, and institutional aspects. These four consist of various indicators that play an important role in maintaining the minapolitan area, which is in line with the development of the city getting shifted by various land use changes.

2.2. Development of Minapolitan Area

Minapolitan area development will not be separated from the social aspect, because the existence of farmers community will greatly affect all the existing development in the region. This is supported by the opinion of Douglas (1986) which states that minabisnis activities based on superior sectors in the form of fishery sector should involve large actors and large communities in accordance with local wisdom. Efforts to develop the minapolitan region that relies on the fishery sector in driving the economy, in addition to development in social and economic aspects, the minapolitan area should also pay attention to the development of environmental aspects, especially coastal areas as the main resource providers and other environmental services (Dahuri, 2004). The availability of natural resources provided by the environment is very important for the life of the people in it, because if the natural resources used as the main economic support in the area runs

out or damaged, it will greatly affect the sustainability of the minapolitan area, and of course also impact on the economy of the community . With the existence of it will influence to increase prosperity of farmer society. And when viewed from the social aspect mentioned by Dahuri (2012), the absorption of labor will of course affect the welfare of the farmers community, especially in terms of increasing the income of the cultivators. Besides, the wellbeing of the farmers can also be seen from how the level of education and the level of health of the cultivators that influence how the farmer community becomes a productive society. Therefore based on this matter, it can be determined in this research the existence of farmers welfare indicators who can be measured from the variable of labor absorption cultivators, the level of farmer's income, the level of cultivator education, and the health level of the cultivators.

2.3. Land Use Change

Land use is any form of human intervention to the land in order to meet the needs of both material and spiritual life (Vink, 1975). According to Wahyunto et al (2001) land use change is defined as increasing a land use from one side of use to another using a decrease in other types of land use over time, or changing the function of a land over a different period of time. Land use change or land use conversion is a change of certain land use to other land uses where due to unchanged land area, certain land use will result in decreasing other land uses (Sanggono, 1993). Based on that, it can be concluded that the existence of minapolitan area has the potential to be displaced by new activities that lead to the transfer of land area of minapolitan area. So in this study based on it is obtained indicator of land use minapolitan area that belong to environmental aspect.

Besides Warpani in Noorwahyuni (2006) states that the price of land becomes one of the affect factor because the price of land tends to affect the change of land use in areas whose land prices are still low. Sarah K. in Sanggono (1993) also added that land use change is closely related to changes in land values because there is a positive correlation between land use and land value. The very limited provision of land to meet the needs of the community, government and private sectors tends to lead to an increase in land prices which further encourages widespread land speculation, resulting in less efficient urban land use patterns. Based on this, the price of land becomes one of the considerations that also affect the existence of Minapolitan area, so in this study obtained variable land value of minapolitan area.

Based on the opinion of Warpani and Lambin et al (2001) above, it is found that the number of people who always experience change resulted in the need of space as a container of urban activity will also experience changes continuously. Space in this case is land, its existence can not be separated with the development of human life, because the land is a container where various activities to ensure the survival of human life. Therefore, the dynamics of life of a number of residents in a region will be reflected the relationship of interaction of the activity of the population with its environment. So that the increasing number of people becomes one of the things that must be considered in its effect on the change of land use in urban areas. So in this study got

one of the indicators related to the consideration of the increasing population in the minapolitan area is an indicator of population growth, which can be seen from the variable rate of population growth.

III. RESEARCH METHODS

A. Identification of factors affecting land use change in the minapolitan area

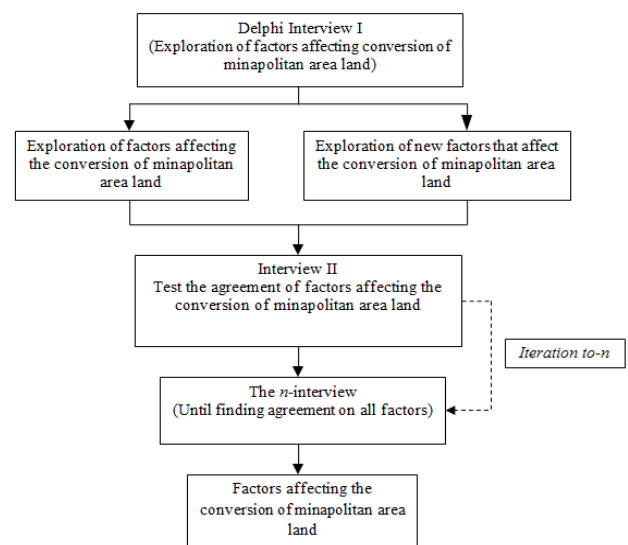
In analyzing the factors that influence the land use change of minapolitan area is done by using descriptive method. According to Nazir (1988: 63) descriptive method is a method in examining the status of a group of people, an object, a set of conditions, a system of thought or a class of events in the present, with the aim to create a description, picture, or painting in a systematic, factual and accurate information about the facts, traits and relationships among the phenomena under investigation.

In this analysis, the variables derived from the literature review will be compared with the literature study and the existing conditions in the study area. Variables that have similarities will be grouped and will form several factors that are factors that affect land use change of minapolitan area. Variables to be processed by using descriptive analysis is the whole of research variables obtained from the results of literature review.

B. Determination of factors that affect the land use change of minapolitan area

The Delphi technique is the most effective way to identify factors that lead to the failure of detailed urban implementation plans, which is particularly useful in situations where no standard criteria exist for evaluation (Taleai and Mansuorian, 2008).

The Delphi technique is an iterative process designed to reach consensus among a group of experts on a particular topic. Stages of Delphi technique can be seen in the scheme below.



Stages of Delphi Analysis

Source : Processed from Fowles (1978)

IV. RESULTS AND DISCUSSION

4.1. General Description

Sedati District is one of districts in Sidoarjo Regency which has wide reaching 7,892 Ha or 79,26 Km². Geographically located at the position of 112.5° - 112.9° East Longitude and 7.3° - 7.5° South Latitude, with the following boundaries:

- North : Waru District
- East : Madura Strait
- West : Gedangan District
- South : Buduran District

Sedati District consists of 16 villages, which Kalanganyar village is the largest village that reaches 3.061 Ha or 38.79% of the area of Sedati District. While the village of Pulungan is the smallest village with an area of 104 Ha or 1.32% of the total area of Sedati District.

A. Basic Physical Conditions

Sedati District has a wet tropical climate with an average rainfall of 243 mm / year and an average temperature of 26.1° - 27.4° Celsius and average humidity and relative humidity of 69.4% - 85.5% year-round. Based on the condition of topography, Sedati District is relatively flat and partially corrugated that is in the range 0-4 meters above sea level (asl) and has a slope of 0-2%. For soil types in the planning area include alluvial gray and alluvial hydromor, with hydrological conditions categorized flood periodically as it is at an altitude of 0-4 meters above sea level (asl).

B. Population

Based on the results of population registration, the population of Sedati District in the period of 2012 - 2015 has increased, as seen from the total population in 2012 of 98.751 people and increased in 2015 to 99.010 people. The largest population is in the Pabean village of 19.325 people in 2012 and continues to increase until 2015 reached 19.556 people.

C. Accessibility

In Sedati, most road conditions have asphalt surface of 113 km and 327 km of paving. Besides, there are also roads with surface conditions still in the form of macadam and soil.

D. Land Use

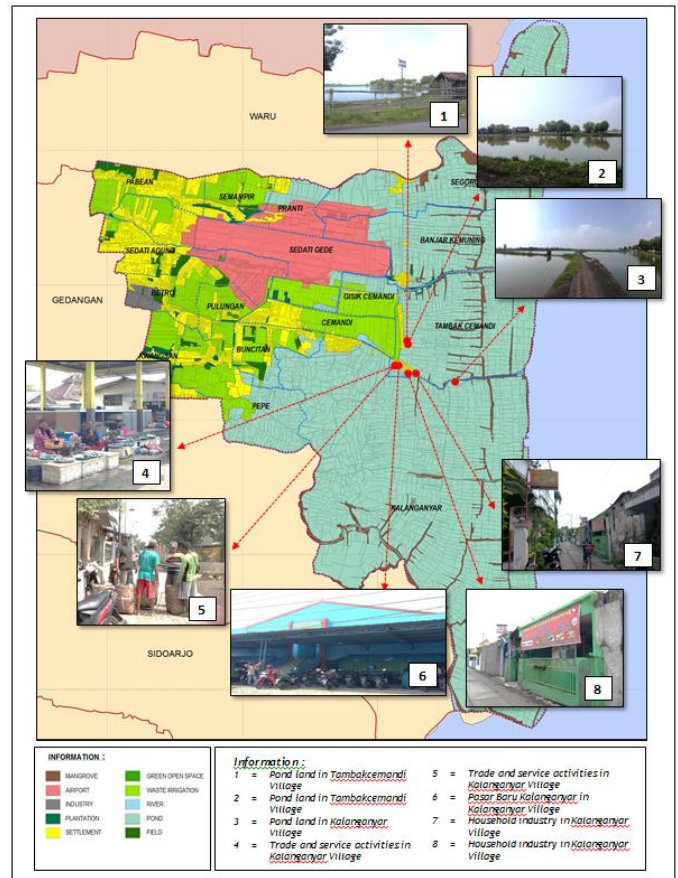
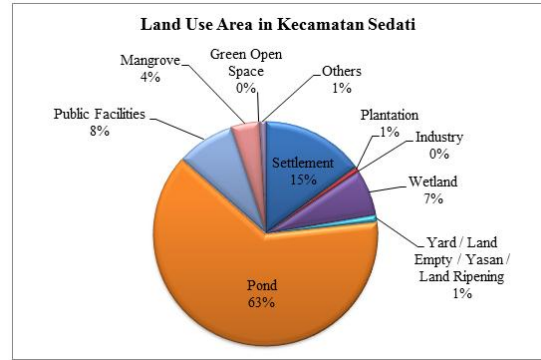
In the land use pattern in Sedati District, the largest type of land use is ponds with an area of 5.073,80 Ha or about 63.9% of the total area of Sedati District. In addition, the dominance of land use in Sedati District is 15% of settlements and 8% for public facilities. For more details note the following tables and diagrams :

Land Use in Sedati District

No	Land Use	Land Area (Ha)	%
1	Settlement	1.193,576	15,027
2	Plantation	57,108	0,719
3	Industry	-	-
4	Wetland	540,000	6,798
5	Yard / Land Empty / Yasan / Land Ripening	78,144	0,984
6	Pond	5.073,080	63,869
7	Public Facilities	670,185	8,437
8	Mangrove	328,156	4,131
9	Green Open Space	12,253	0,154
10	Others	64,652	0,814

Source : Spatial Plans of Sidoarjo Regency, 2009-2029

Wide Area Diagram of Sedati District Land Usage



4.2. Identify Factors Affecting Land Use Change of Minapolitan Areas

The identification of factors affecting land use change of minapolitan area is based on existing condition in the study area. The following will show the variables which will be grouped into several factors in accordance with the relevance of some of these variables.

Research Variables Will Be Grouped into Factors

NO.	VARIABLES	SUB VARIABLES
1	Number of business units minabisnis	-
2	Minabisnis supporting facilities	Availability of production units
		Availability of processing unit
		Availability of marketing unit

NO.	VARIABLES	SUB VARIABLES
3	Number of minabisnis workers	-
4	Minimum employer's income level	-
5	Intensity of production minabisnis	-
6	Productivity minabisnis	-
7	Minimum employment	-
8	Minimalist level of education	-
9	The level of health of minabisnis players	-
10	Population growth rate	-
11	Availability of roads	-
12	Access to electrical energy	-
13	Access to clean water	-
14	Minapolitan area value	-
15	Types of land use	-
16	Converted minapolitan land area	-
17	Speed of land use change	-
18	Coordination among stakeholders	-
19	Legal certainty	-
20	Transparency of permit data of Minapolitan land use change	-

Source: Results of Literature Review, 2017

A land of minapolitan areas can be converted through various aspects, for example from economic, social, cultural, as well as legal aspects. The variable value of minapolitan area land is increasing due to the development of investment in the form of non-minapolitan activities, such as housing development, office building, service trade, and various other activities developed by investors. This happens because of the strategic location and the development of urban areas, especially because it is adjacent to Surabaya City, Juanda International Airport, and the existence of sea tourism development plan at Sedati beach. With the development of this investment causes the value of ponds increased and an opportunity for the owners of ponds to gain profits. Besides, investor interest to take over the pond area is also accompanied by the availability of adequate infrastructure facilities in the area. It can be seen from the existence of adequate road facilities, as well as the availability of electrical energy and clean water which is also quite adequate. So the availability of adequate infrastructure facilities increasingly support the investors to invest in the region. So it can be concluded that the factors that contain the variable land value of minapolitan area, the availability of roads, access to electrical energy and access to clean water, can be grouped as a **factor of investment development**.

The effort to change the land function of the minapolitan area is also influenced by how many workers concentrate on the minabisnis activities, how the minapolitan support facilities are owned and how much production is obtained. With the existence of various development outside minapolitan activities such as that currently occur in the research area, the impact on the decrease of environmental carrying capacity to the development of pond cultivation. This resulted in a decrease in production results obtained, so that other minabisnis activities such as home industries and fish trade services will also weaken further. In addition, with the decreasing production results, the minabisnis players / workers will find other sources of income because they are considered not able to meet the needs of his life if he persisted in these minapolitan activities. And the slackening of the cultivation of

ponds farmers due to the decline in fish production resulted in many fish farmers looking for other jobs outside minapolitan activities. Besides, from the availability of supporting facilities minabisnis in the area of research also still not available. In the process of production, marketing, and processing are all done independently by minabisnis actors because there is no support from the government for the development of minapolitan activities. Production results obtained independently, either sold directly or through the collectors, or processed into a form of processed food. So with the lack of support units of production facilities, marketing and processing from the government, the production is also still not maximized because it is still done in the traditional way. Based on the above, it can be seen that there is a relationship between the variables of the number of labor minabisnis, the absorption of minabisnis workers, and facilities support minabisnis with income levels, the intensity of production and minabisnis productivity. So that these variables can be classified into one factor that is the **minabisnis production potential factor**.

The existence of land use minapolitan area increasingly converted for other uses outside minapolitan activities because of the demands of regional development and strategic location with the centers of activity. More and more investors are eyeing the ponds in Sedati District because of its location adjacent to Surabaya City and Juanda International Airport. A lot of land is sold in a short time to investors because the purchase price offered is high enough for the pond area that is not small too, so the owners of ponds are mostly willing to sell. This is because the price offered is able to provide the benefits of excessive pond owners when compared with retaining the pond land which is increasingly day decreased production. Based on the above, there is a link between the use of minapolitan land, the area of converted land and the speed of changes in mineral land use. So the three variables can be classified into one factor, that is the **driving factor of land conversion minapolitan**.

The management effort of pond area basically has been contained in Regional Regulation of Sidoarjo Regency Number 6 in 2009 about Spatial Plan of Region of Sidoarjo Regency in 2009-2029, where mention that effort of fishery area management one of them is Sedati District done by protecting pond area from the development of industrial activities and settlements, controlling the rate of change of land use from ponds to settlements and industry, protecting ponds and river fisheries from industrial waste pollution, and etc. However, when viewed from the existing condition of the current changes in pond land use by investors is increasing, so it needs a coordination between the government and the private sector in terms of licensing pond land converted in accordance with applicable local regulations. Based on this, the variable of legal certainty is a variable that can stand alone as a factor affecting the change of land use due to the rule of law is a tool of control of land use that does not have the same characteristics with other variables. Similarly, coordination among stakeholders and the transparency of data on land use change permits is also a stand-alone variable as a factor influencing land use change as the institution as the main actor

in supervision of pond cultivation pond management that does not have the same characteristics as other variables. Therefore, the variables of legal certainty are included in **law implementation factor**, while the coordination variables among stakeholders and the transparency of permit data of land use change are included in the **surveillance of land change control factor**.

In addition, in terms of population, population growth in Sedati District is increasing every year. This is not only due to birth but also influenced by the migration of people from other settled areas in Sedati District. Conversion of pond land in the research area is part of development activities that can not be avoided. As long as the population growth is high and economic development activities are still ongoing, the conversion of the land will continue to occur. Population growth will affect the efforts to increase the need for land for housing development for the welfare of the community. And the welfare of society itself, which is a minabisnis actor, can also be influenced in terms of education level and health level, which in turn will affect how the society becomes productive society. In a sense, efforts to mobilize the growing population to become minabisnis actors in order to preserve and maintain the existence of pond land, must also be balanced with a good level of health and provided with sufficient level of education, namely the related education on how land management efforts and new techniques that are likely to be implemented in Sedati District and not just fixated on traditional techniques. Based on the above, population growth variable, education of minabisnis actors variable, health of minabisnis actors variable can be said to have related with one another, so that can be grouped into one factor, that is **demography growth factor**.

Based on the results of descriptive analysis of the various variables above, then generated six factors that affect changes in pond farming utilization as a land area minapolitan Sedati District, namely:

Organization Table Variables in Factors

NO	FACTOR	VARIABLE MEMBERS
1	Investment development	1. The value of Minapolitan area 2. Availability of road facilities 3. Access to electrical energy 4. Access to clean water
2	Minabisnis production potential	1. The amount of labor minabisnis 2. Absorption of minabusines workers 3. Minerbanis supporting facilities 4. Number of business units minabisnis 5. The income level of the minaby actors 6. Intensity of production minabisnis 7. Productivity minabisnis
3	Driving the conversion of minapolitan land	1. Types of Minapolitan Land Use 2. Minapolitan area of converted land 3. Speed of land use change Minapolitan
4	Law implementation	1. Legal certainty
5	Surveillance of land change control	1. Coordination among stakeholders 2. Transparency of data on land use change permit

NO	FACTOR	VARIABLE MEMBERS
6	Demographic growth	1. Population growth 2. Level of education 3. Health level

Source : Analysis Results, 2017

Based on the results of the descriptive analysis above, the factors that influence the changes in the utilization of Minapolitan area. In the analysis there are several variables that can stand alone as a factor affecting changes in the utilization of land minapolitan area.

The influential factor is obtained from the comparison between the variables and the factors that influence the change of land utilization of Minapolitan area according to existing condition in the research area. Factors obtained include:

1. Investment development
2. Minabisnis production potential
3. Driving the conversion of minapolitan land
4. Law implementation
5. Surveillance of land change control
6. Demographic growth

Having obtained the factors that influence the change of land use of minapolitan area from the descriptive analysis above, then the selection process of the influential factors is done by using Delphi technique and involving the respondent, which has been specified in the Stakeholders analysis. The respondents expressed their opinions about their agreement or disapproval of the influential factors that have been formulated.

4.3. Factor Analysis Affecting Land Use Change of Minapolitan Area

1. Phase I

At this stage, the excavation (exploration) of the respondents about the factors that influence the conversion of land / transfer of land in minapolitan area. The method used to obtain these factors is through semi-structured interviews. Respondents may add to the factors offered and may also reduce existing factors. The results are as follows:

Results of Delphi Interview Phase I

No	Factors affecting changes in Minapolitan area	Respondents				
		R1	R2	R3	R4	R5
1	The factor of investment development influences the change of land use of Minapolitan area in Sedati District	E	E	E	E	E
2	The potential factor of minabisnis production resulted in changes in land use in the Minapolitan area in Sedati District	E	I	E	E	I
3	The driving factor of the conversion of minapolitan land affects the change of land use in the Minapolitan area in Sedati District	E	E	E	E	E
4	The factor of law implementation influences the change of land use of Minapolitan area in Sedati District	E	E	E	E	E
5	The surveillance for land change control of Minapolitan area in Sedati District	E	E	E	E	E

No	Factors affecting changes in Minapolitan area	Respondents				
		R1	R2	R3	R4	R5
6	Demographic growth factors influence land use change in Minapolitan area in Sedati District	I	E	E	I	I

Source: Analysis Results, 2017

Information :

- E : Effective
- I : Ineffective
- R1 : Regional Planning and Development Agency of Sidoarjo Regency
- R2 : Department of Fisheries of Sidoarjo Regency
- R3 : District Government of Sedati
- R4 : Ponds Cultivators of Sedati Districts
- R5 : Public Figure

2. Phase II


According to the results in phase I then the addition of two factors that influence the opinion of the respondents. Additional factors are land ownership and urban development factors. So that the number of factors that will be processed in the second phase of the interview into 8 factors.

Phase II is the first iteration. This iteration reduces the factors needed to get the agreement of the respondents about the factors that affect the conversion of Minapolitan area land. The first iteration results can be seen in the following table.

Results of Delphi Interview Phase II

No	Factors affecting changes in Minapolitan area	Respondents				
		R1	R2	R3	R4	R5
1	The factor of investment development influences the change of land use of Minapolitan area in Sedati District	A	A	A	A	A
2	The potential factor of minabisnis production resulted in changes in land use in the Minapolitan area in Sedati District	A	A	A	A	A
3	The driving factor of the conversion of minapolitan land affects the change of land use in the Minapolitan area in Sedati District	A	A	A	A	A
4	The factor of law implementation influences the change of land use of Minapolitan area in Sedati District	A	A	A	A	A
5	The surveillance for land change control of Minapolitan area in Sedati District	A	A	A	A	A
6	Demographic growth factors influence land use change in Minapolitan area in Sedati District	D	D	A	D	A
7	Land ownership factor influences the change of land use of Minapolitan area in Sedati District	A	A	A	A	A
8	The urban development factor influences the change of land use of Minapolitan area in Sedati District	A	A	A	A	A

Source: Analysis Results, 2017

 : Not consensus

Information :

- A : Agree
- D : Disagree
- R1 : Regional Planning and Development Agency of Sidoarjo Regency
- R2 : Department of Fisheries of Sidoarjo Regency
- R3 : District Government of Sedati
- R4 : Ponds Cultivators of Sedati Districts
- R5 : Public Figure

3. Phase III

From the result of Delphi stage II, there are factors that have not been agreed to become the factors that influence the change of land use in Minapolitan area. The factors are demographic development factors. Of the factors that have not reached a consensus and have not been agreed upon by all respondents, another stage of interview processing is done. The results of interview processing stage III can be seen in the table below.

Results of Delphi Interview Phase III

No	Factors affecting changes in Minapolitan area	Respondents				
		R1	R2	R3	R4	R5
1	Demographic development factors influence land use change in Minapolitan area in Sedati District	D	D	D	D	D

Source: Analysis Results, 2017

Information :

- A : Agree
- D : Disagree
- R1 : Regional Planning and Development Agency of Sidoarjo Regency
- R2 : Department of Fisheries of Sidoarjo Regency
- R3 : District Government of Sedati
- R4 : Ponds Cultivators of Sedati Districts
- R5 : Public Figure

From the results of interview Delphi stage III obtained consensus from the respondents about the factors that affect the land use change of minapolitan area. For more details, here is a description of the respondent's exploration results:

• **Demographic developmental factors**

In the demographic growth factor has been established consensus that this factor has no effect on efforts to land use change of minapolitan area. It is agreed that the development of demography is considered to be less influential because although there is a decrease or increase in the number of population, the development by investors from the conversion of the pond area is still happening up to now, whether for housing, industry, trade services, and others. This is due to the strategic location with the location of the new infrastructure development plan and other activities. In addition, if assessed from the level of education / knowledge and public health, is also considered to have no effect. Efforts to change land use continue to occur even though the pond farmers are equipped with more knowledge about processing ponds and good health levels. This is due to uncertain production results, thus impacting their income. Besides, the offer of investors to buy with high prices increasingly move the pond farmers to sell their ponds.

Based on the Delphi analysis to get agreement on the factors that influence the land use change of minapolitan area, the factors are as follows:

1. Investment development
2. Minabisnis production potential
3. Driving the conversion of minapolitan area
4. Law implementation
5. Surveillance of land change control
6. Land ownership
7. Urban development

V. CONCLUSION

Based on the results of previous research and using Delphi Analysis techniques, it can be concluded that the factors that influence the land use change of minapolitan area, namely:

- (1) Investment development
- (2) Minabisnis production potential
- (3) Driving the conversion of minapolitan area
- (4) Law implementation
- (5) Surveillance of land change control
- (6) Land ownership
- (7) Urban development

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