Geographica: Science and Education Journal
GSEJ
Website: http://usnsj.id/index.php/geographica
Email: geographica_gsej@usn.ac.id

MAPPING OF DEVELOPMENT OF LAND SUITABILITY FOR AGRICULTURE AND LIVESTOCK IN GRESIK REGENCY

AUTHORS INFO

Listin Fitrianah
Studies Environmental Engineering
Faculty of Engineering
Sidoarjo Nahhdlatul Ulama University
listin_fitri.tkl@unusida.ac.id

ARTICLE INFO

ISSN: 2716-4837
Vol. 6, No. 2, December 2024
URL: http://usnsj.id/index.php/geographica

Suggestion for the Citation and Bibliography
Citation in Text:
Listin, F. (2024)
Bibliography: Listin, F. (2024). Mapping of Development of Land Suitability for Agriculture and Livestock in Gresik Regency. *Geographica: Science & Education Journal, 5* (2, June), 84-91.

Abstract

Gresik Regency is a strategic area for the development of the national economic center in the industrial, trade and service, agriculture, fisheries and tourism sectors. Therefore, Gresik Regency will often face various obstacles and problems, one of which is urbanization. The study conducted to determine the potential of basic commodities using the Location Quotient (LQ) method. LQ analysis was conducted on data obtained from secondary data (crop production data and livestock numbers) so that information on basic commodities in Gresik Regency was obtained.Result Basic commodities in the food crop sector there are several commodities that are the basis in Gresik Regency, namely rice, corn, peanuts, green beans, soybeans, and cassava. In basic commodities in the plantation sector that there are several commodities that are the basis in Gresik Regency, namely coconut, kapok, castor oil, tobacco, and sugar cane. That there are several livestock commodities that are the basis in Gresik Regency, namely dairy cattle, beef cattle, buffalo, horses, goats, sheep, laying hens, native chickens, broiler chickens and ducks.

Keywords: Land suitability, Location Quotient, mapping, agriculture, livestock

A. Introduction

Gresik Regency is one of the regencies in East Java Province located in the northwest of Surabaya City. Gresik Regency is a strategic area for the development of the national economic center in the industrial, trade and service, agriculture, fisheries and tourism sectors. Therefore, Gresik Regency will often face various obstacles and problems, one of which is urbanization. This is evidenced by the increasing population growth rate living in Gresik Regency. The population of Gresik Regency has increased in the last five years. Every year, the average population of Gresik Regency increases by approximately 13,929 people with a percentage increase based on 2016 to 2020 of 4.38%. Therefore, the fairly high population density causes problems in Gresik Regency such as increasing food needs.

In addition to being the largest industrial sector area in East Java, Gresik Regency is also known as an agricultural area with fertile agricultural and fisheries potential. The majority of people's livelihoods are pond and rice field farmers, while the natural conditions in this area greatly support the community in carrying out farming, gardening and fish farming activities. The conversion of rice fields to settlements in Gresik Regency is 159.78 hectares, while the area of rice fields converted due to the development of industrial areas is 66.55 hectares (Firmansyah, F. et al., 2021). So that the problem arises, namely that most of the productive agricultural land has turned into. Areas. Which. Built as offices, houses, factories and shopping centers so that productive agricultural land is limited.

The need for food from livestock continues to increase in line with the increasing population, awareness of nutritious food and economic growth of the community. The increasing demand conditions require strategic steps so that the provision of food from livestock can be met. Therefore, it is necessary to continue to encourage various resources including capital, humans, technology and land resources so that they can continue to play a role in increasing the population, production and productivity of livestock. The regional approach is one of the livestock development strategies by considering the potential in each region.

Changes in the external environment through the process of globalization require provincial governments to increase their competitiveness so that they are able to compete globally. If this is not done, local products produced by the region will be crushed by cheaper and better quality imported products. Changes in the internal environment, namely regional autonomy, with the enactment of Law Number 32 of 2004 and fiscal decentralization, require encouraging regional independence in order to create better economic conditions, based on the preferences and needs of its people. Regional competitiveness needs to be increased, among others, by developing unique product competencies as superior products. If regional competitiveness increases, national competitiveness will automatically increase. Superior regional products must consider the development of partnerships between regions (between villages, sub-districts and between regencies) and avoid unhealthy competition between these regions.

Location Quotient (LQ) method to determine the contribution of each commodity of the food agriculture sector in a region (district), only districts that have an LQ value > 0.5 will be used as research objects. For this reason, this study was conducted to obtain a map of district/city groupings in East Java based on the potential of the food agriculture sector. One method that can be used is clustering analysis for the process of grouping objects based on a measure of similarity or dissimilarity and aims to determine groups based on a group of objects studied (Johnson and Wichern, 2002). The results of this grouping are expected to provide information on the potential of agriculture and livestock in Gresik Regency.

The purpose of this study is first, to analyze the commodities of the agricultural, plantation and livestock sectors that support the agribusiness system in Gresik Regency. Second, to analyze the characteristics of the agribusiness system in selected superior commodities in Gresik Regency.

B. Methodology

1. Research Design

In general, the scope of implementation of activities for the Mapping of Agribusiness Development in the North East Java Region is divided into three stages, namely: (1) Preparation stage; (2) Implementation stage and (3) Completion stage.

In the preparation stage includes: a) Literature study, This activity is an effort to obtain theories and theoretical input related to the development of agriculture and livestock in Gresik Regence; b) Initial data study, In this activity, the conditions and data of sub-district areas in Gresik Regency will be collected; c) Survey and mapping, Survey and mapping are stages to obtain information on potential commodities and agribusiness development. Survey activities are carried out by conducting interviews with stakeholders related to agricultural business actors and related agencies**.**

2. Instruments

Implementation of the Study on Mapping Potential for Agricultural and Livestock Development in Gresik Regency:

1. Desk study approach: (1) reviewing the performance of agricultural and plantation production, including the area of rice fields, harvested area of rice fields and gardens, production, productivity, (2) reviewing the availability of infrastructure and supporting facilities for agricultural and livestock development, based on secondary data.
2. Conducting field observations/surveys of rice agribusiness actors in selected samples; to capture the actual conditions and problems of rice agribusiness in the field (Sugiyono, 2011)

*3***.** *Technique of Data Analysis*

a. Identification of the potential and characteristics of basic commodity agribusiness

The study conducted to determine the potential of basic commodities using the Location

Quotient (LQ) method. LQ analysis was conducted on data obtained from secondary data (crop production data and livestock numbers) so that information on basic commodities in Gresik Regency was obtained.

$$LQ = \frac{Xij / Xi.}{X.j / X..}$$

Description:

Xij : degree of activity of j in region i
Xi : total activity in region i
Xj : total activity of j in all regions
X : degree of activity of total region

The measurement criteria of the resulting LQ value refer to the criteria put forward by Bendavid-Val (1991) as follows:

- LQ > 1, meaning the level of specialization of a particular activity at the sub-district level is greater than the same activity at the district level.
- LQ < 1, meaning the level of specialization of a particular activity at the sub-district level is smaller than the same activity at the district level.
- LQ = 1, meaning the level of specialization of a particular activity at the sub-district level is the same as that of the same activity at the district level.

Basic commodity information based on the results of the LQ analysis is then used to identify the agribusiness system in each commodity. Identification of the agribusiness system uses a descriptive method. Analysis is carried out on data obtained from primary data through surveys and secondary data so that information on the characteristics of agriculture and livestock in Gresik Regency is obtained (Hendayana, 2003).

b. Mappinng Analysis (Overlay)

Mapping method by utilizing spatial attribute information from spatial data related to the rice agribusiness system such as land cover elements, spatial patterns, spatial structures, land forms, regional network systems, and spatialized calculation data (Prahasta, 2009). Overlay Analysis is carried out by building logic that areas that are suitable and have the potential for developing rice agribusiness are areas that have information on suitability and potential for the parameters used (Setiyawan, 2014).

C. Findings and Discussion

1. Basic commodities in the food crop sector

The food crop sector of Gresik Regency is one of the areas that is the basis for rice, cassava, and green beans (LQ East Java), this condition can be interpreted that Gresik Regency is one of the areas that supports food needs in East Java. After the basic commodities at the provincial level are known, further analysis is then carried out to determine the distribution of basic commodities in each sub-district. The results of the Location Quotient (LQ) analysis of food crops in Gresik Regency which are based on the production results of each sub-district's commodities are shown in Table 1 and information on the distribution of commodities is shown in Figure 1.

The results of the LQ analysis as shown in Table 1 obtained information that there are several commodities that are the basis in Gresik Regency, namely rice, corn, peanuts, green beans, soybeans, and cassava (cassava). The commodities of rice, cassava, and green beans in Gresik Regency can be said that this region has been able to meet its own needs and can even export to other regencies in East Java, while for the commodities of corn, peanuts, and soybeans, they are only able to meet the needs in the Gresik Regency area.

***Table 1**. LQ values for food crops in Bojonegoro Regency*

No.	Sub district	Paddy	Corn	Peanuts	mung beans	Soya bean	Cassava
1	Wringinanom	1,00	1,36	0,13	0,00	0,18	0,12
2	Driyorejo	1,80	0,17	0,21	2,39	0,47	0,52
3	Kedamean	1,31	0,32	0,07	5,15	5,96	2,42
4	Menganti	0,59	1,85	0,08	2,49	2,51	0,03
5	Cerme	1,91	0,17	0,01	0,43	0,00	0,09
6	Benjeng	1,68	0,47	0,01	1,42	0,25	0,06
7	Balongpanggang	1,90	0,20	0,00	0,00	0,00	0,00

No.	Sub district	Paddy	Corn	Peanuts	mung beans	Soya bean	Cassava
8	Duduksampeyan	2,04	0,00	0,00	0,00	1,20	0,00
9	Kebomas	1,82	0,06	0,022	0,68	0,79	0,96
10	Gresik	0,00	0,00	0,00	0,00	0,00	0,00
11	Manyar	0,00	2,73	0,00	0,00	0,00	0,00
12	Bungah	1,50	0,39	0,82	0,97	1,58	0,84
13	Sidayu	1,03	1,21	0,55	0,00	0,00	0,31
14	Dukun	1,26	0,76	0,42	0,22	0,03	1,12
15	Panceng	0,52	1,90	0,72	0,21	0,33	0,00
16	Ujungpangkah	0,01	2,13	3,43	0,00	0,00	0,00
17	Sangkapura	0,55	0,05	3,99	0,00	0,00	6,35

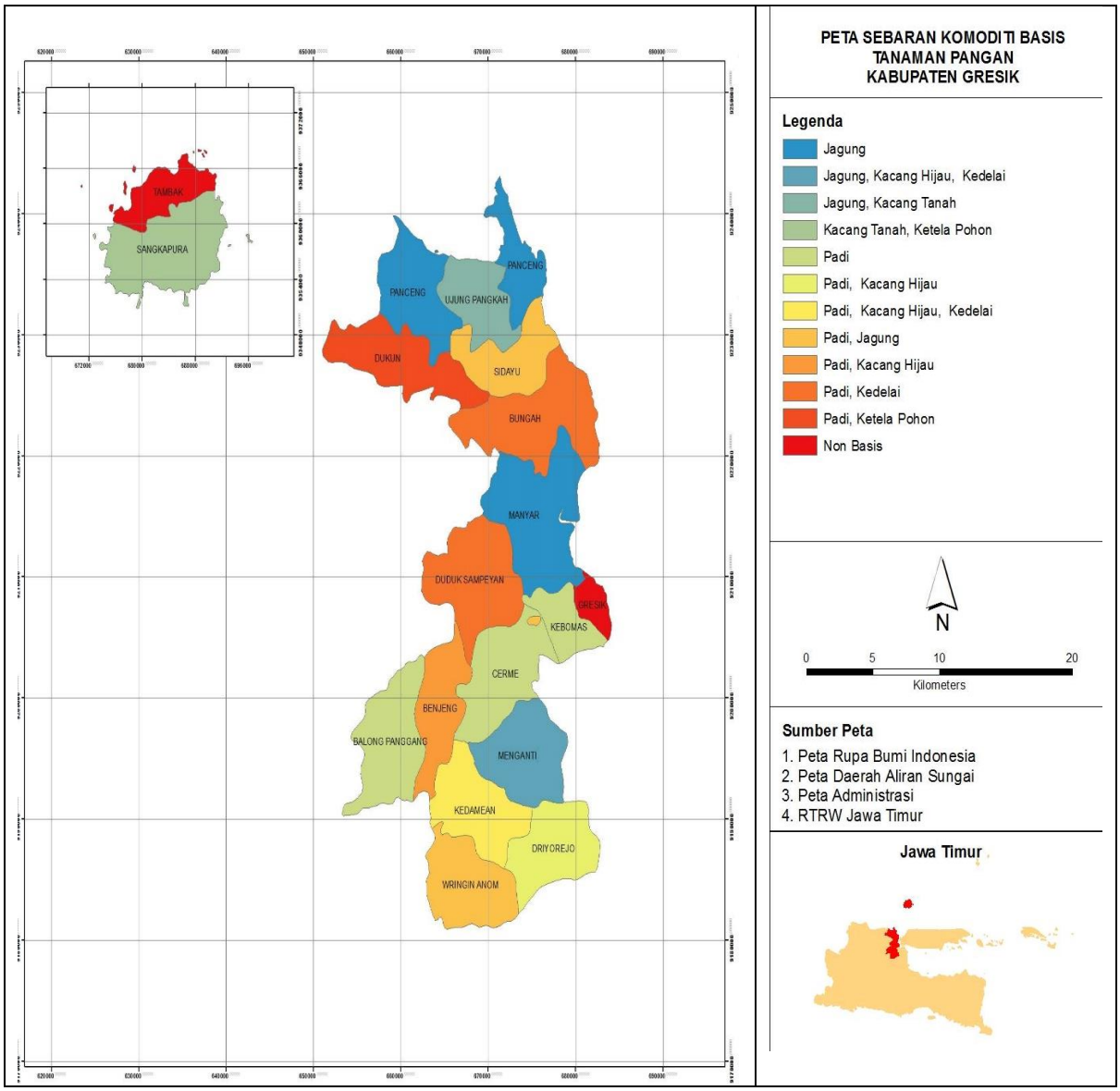

Figure 1. *Distribution of food crop based commodities in Gresik Regency*

3. Basic commodities in the plantation sector

In the plantation sector, Gresik Regency is one of the areas that is the basis for coconut and sugarcane plants (LQ East Java), this condition can be interpreted that Gresik Regency is one of the areas that is a center for meeting the needs of coconut and sugarcane in East Java. The results of the analysis of the Location Quotient (LQ) of plantation crops in Gresik Regency which are based on the production results of each sub-district's commodities are shown in Table 2, while information on the distribution of commodities is shown in Figure 2.

The results of the LQ analysis as shown in the table above obtained information that there are several commodities that are the basis in Gresik Regency, namely coconut, kapok, castor oil, tobacco, and sugar cane. The production results of kapok and tobacco commodities in Gresik Regency can be said that this region has been able to meet its own needs and can even export to

other regencies in East Java, while for castor oil and sugar cane commodities are only able to meet needs in the Gresik Regency area.

Table 2. *LQ values for plantation crops in Gresik Regency*

No.	Sub district	Coconut	Clove	Coffee	Cashew	Cotton wood	Cocoa	Tobacco	Turmeric	Sugar cane	Siwalan
1	Wringinanom	0,02	0,00	0,00	0,57	023	0,00	0,00	0,56	1,41	0,00
2	Driyorejo	0,02	0,00	0,00	0,36	0,30	0,00	0,00	1,43	1,34	0,00
3	Kedamean	0,14	0,00	0,00	1,28	1,63	0,00	0,00	2,12	1,23	0,00
4	Menganti	0,58	0,00	0,00	6,78	6,29	0,00	0,00	8,56	0,00	15,87
5	Cerme	3,43	0,00	0,00	34,82	46,81	0,00	0,00	0,00	0,00	0,00
6	Benjeng	1,02	0,00	0,00	7,76	10,17	0,00	0,00	11,90	0,00	0,00
7	Balongpanggang	0,15	0,00	0,00	0,57	0,58	0,00	8,59	1,04	1,23	0,00
8	Duduksampeyan	4,45	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
9	Kebomas	1,06	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	38,31
10	Gresik	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
11	Manyar	3,82	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	7,11
12	Bungah	1,48	0,00	0,00	2,27	7,63	0,00	0,00	10,54	0,00	0,00
13	Sidayu	0,18	0,00	0,00	3,01	2,87	0,00	0,00	0,00	1,39	0,00
14	Dukun	4,32	0,00	0,00	3,97	6,60	0,00	0,00	0,00	0,00	0,00
15	Panceng	2,74	0,00	0,00	4,72	2,52	0,00	0,00	0,00	0,00	18,29
16	Ujungpangkah	0,48	0,00	0,00	0,00	2,57	0,00	0,00	0,00	1,16	5,07
17	Sangkapura	4,35	5,90	5,90	0,39	0,33	5,90	0,00	0,00	0,00	0,00

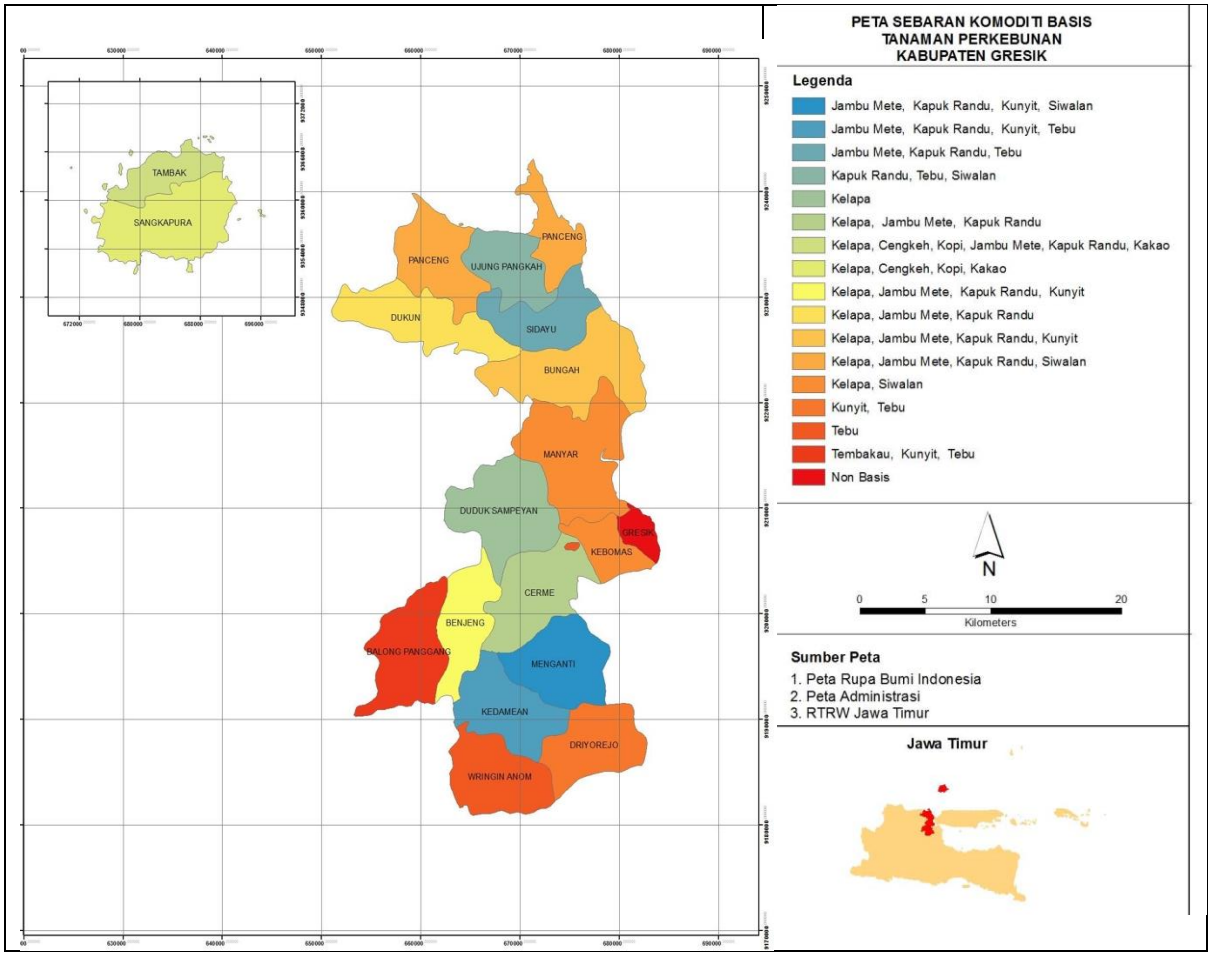

Figure 2. *Distribution of plantation-based commodities in Gresik Regency*

4. Basic commodities in the livestock sector

Gresik Regency is one of the regencies that is the basis for the development of the livestock sector in East Java, the livestock that is the basis is broiler chickens. . The basic commodities of the livestock sector were then analyzed at the sub-district level, so that information was obtained on the distribution of sub-districts that are the basis for the livestock sector. The results of the

analysis of the Location Quotient (LQ) of livestock at the sub-district level in Gresik Regency are shown in Table 3, while information on the distribution of basic commodities for the livestock sector is shown in Figure 3.

Table 3. *LQ value for livestock in Gresik Regency*

No.	Sub district	Cow	Buffalo	Horse	Dairy cows	Goat	Sheep	Pig	Free range chicken	laying hens	Broiler chicken	Duck
1	Wringinanom	0,06	2,10	0,32	5,31	0,64	0,02	0,00	2,28	0,00	0,49	1,75
2	Driyorejo	1,69	0,73	0,28	0,41	0,08	2,13	0,00	0,54	0,00	0,00	0,70
3	Kedamean	0,04	0,00	0,00	2,64	0,33	0,01	0,00	1,60	0,73	0,58	2,17
4	Menganti	1,88	0,00	0,37	2,32	0,06	1,86	0,00	0,51	0,00	0,17	0,47
5	Cerme	2,52	0,00	0,90	0,00	0,09	0,01	0,00	0,64	0,24	0,26	1,35
6	Benjeng	0,01	0,00	0,96	0,00	0,11	0,01	0,00	0,88	7,09	1,12	2,10
7	Balongpanggang	0,04	0,00	0,86	0,00	0,40	0,01	0,00	1,74	7,12	1,81	1,63
8	Duduksampeyan	0,74	0,00	0,06	0,00	0,12	2,43	0,00	0,20	0,00	0,00	1,17
9	Kebomas	1,61	0,00	3,28	1,57	0,10	2,78	0,00	0,54	0,00	0,25	0,01
10	Gresik	0,43	0,00	2,06	1,78	17,61	0,00	0,00	0,48	0,00	0,00	1,51
11	Manyar	1,59	0,00	2,49	0,00	0,22	0,01	0,00	0,68	0,00	0,30	1,77
12	Bungah	0,07	14,29	0,83	0,00	1,64	0,10	0,00	4,92	5,47	3,20	0,10
13	Sidayu	0,02	6,32	2,11	3,71	0,68	0,03	0,00	2,34	0,00	3,94	0,01
14	Dukun	0,09	5,48	1,43	037	0,82	0,05	0,00	3,81	5,28	4,05	0,03
15	Panceng	0,03	0,00	0,20	0,00	0,16	0,01	0,00	1,02	0,00	5,65	0,00
16	Ujungpangkah	0,05	0,00	3,99	0,00	0,47	0,02	0,00	1,22	0,00	5,18	0,02
17	Sangkapura	0,24	45,43	8,29	0,00	0,72	0,06	0,00	10,11	0,00	0,00	0,08

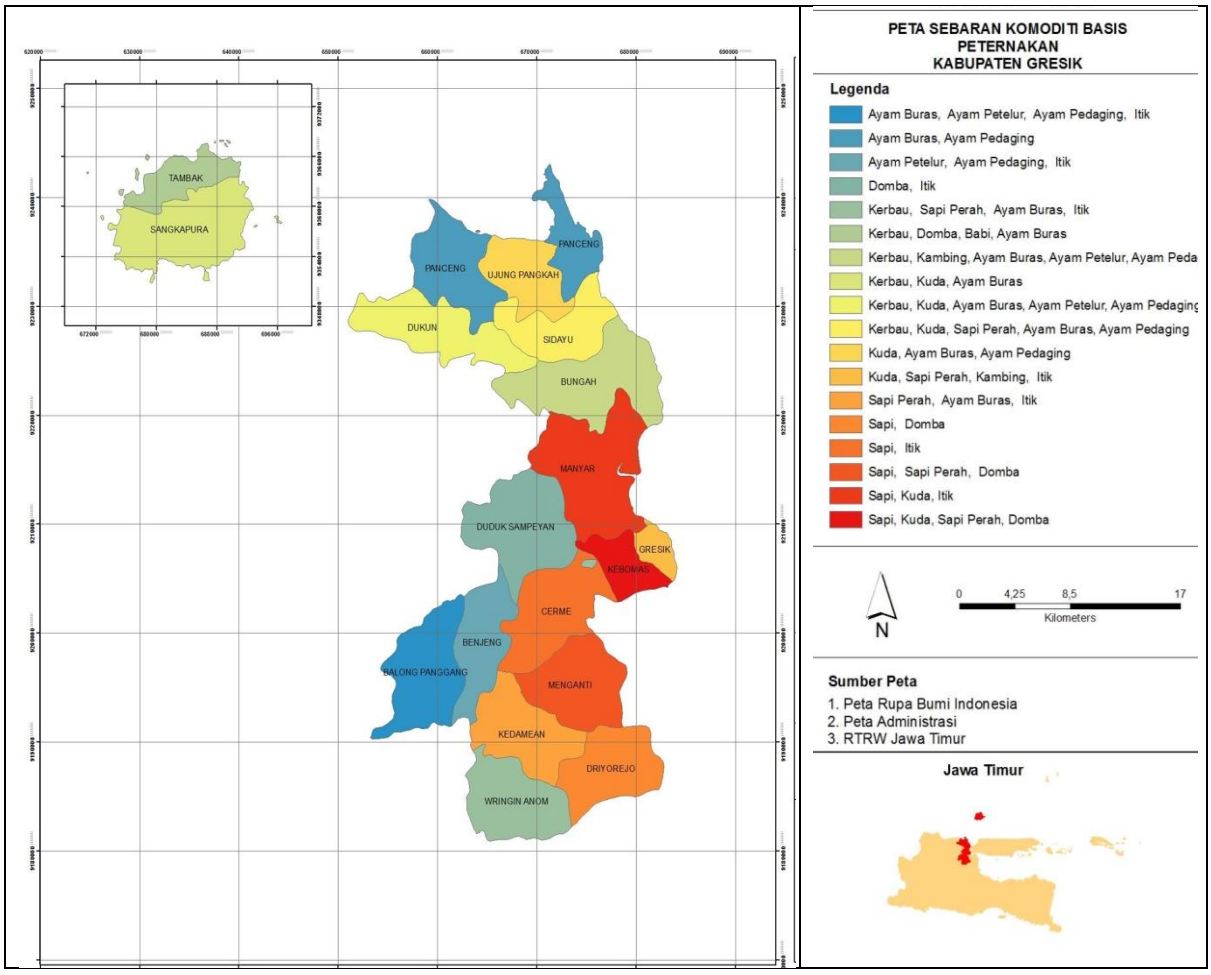

Figure 3. *Distribution of plantation-based commodities in Gresik Regency*

The results of the LQ analysis as shown in the table above obtained information that there are several livestock commodities that are the basis in Gresik Regency, namely dairy cattle, beef cattle, buffalo, horses, goats, sheep, laying hens, native chickens, broiler chickens and ducks. Broiler chickens are commodities that are identified as commodities that can be exported to other regencies in East Java, because these commodities are basic commodities at the provincial level.

Meanwhile, for beef cattle, dairy cattle, buffalo, goats, sheep, native chickens, laying hens, and ducks are only able to meet the needs in the Gresik Regency area of East Java province.

4. Commodity based in Bojonegoro Regency

The results of the analysis of the Location Quotient values of each agricultural and livestock sector, then information on the basic commodities of each sub-district in Bojonegoro Regency can be obtained. The basic commodities of the agricultural and livestock sectors are shown in Table 4.

Table 4. *Basic commodities of each sub-district in Gresik Regency*

No	Sub district	Commodity
1	Wringinanom	Rice, Corn, Sugarcane, Buffalo, Dairy Cow, Native Chicken, Duck
2	Driyorejo	Rice, Green Beans, Turmeric, Sugar Cane, Cows, Sheep
3	Kedamean	Rice, Green Beans, Soybeans, Cassava, Cashew Nuts, Cotton, Turmeric, Sugar Cane, Dairy Cows, Native Chickens, Ducks
4	Menganti	Corn, Green Beans, Soybeans, Cashew Nuts, Kapok Randu, Turmeric, Palm Sugar, Cows, Dairy Cows, Sheep
5	Cerme	Rice, Coconut, Cashew, Kapok Randu, Cow, Duck
6	Benjeng	Rice, Green Beans, Coconut, Cashew Nuts, Kapok Randu, Turmeric, Laying Hens, Broiler Chickens, Ducks
7	Balongpanggang	Rice, Tobacco, Turmeric, Sugar Cane, Native Chicken, Laying Hen, Broiler Chicken, Duck
8	Duduksampeyan	Rice, Soybeans, Coconut, Sheep, Duck
9	Kebomas	Rice, Coconut, Palm Oil, Cow, Horse, Dairy Cow, Sheep
10	Gresik	Horses, Dairy Cows, Goats, Ducks
11	Manyar	Corn, Coconut, Palm Oil, Cow, Horse, Duck
12	Bungah	Rice, Soybeans, Coconut, Cashew Nuts, Kapok Randu, Turmeric, Buffalo, Goats, Native Chickens, Laying Hens, Broiler Chickens
13	Sidayu	Rice, Corn, Cashew, Cotton, Sugarcane, Buffalo, Horse, Dairy Cow, Native Chicken, Broiler Chicken
14	Dukun	Rice, Cassava, Coconut, Cashew, Kapok, Buffalo, Horse, Native Chicken, Laying Hen, Broiler Chicken
15	Panceng	Corn, Coconut, Cashew, Kapok Randu, Siwalan, Native Chicken, Broiler Chicken
16	Ujungpangkah	Corn, Peanuts, Cotton, Sugar Cane, Palm, Horse, Native Chicken, Broiler Chicken
17	Sangkapura	Peanuts, Cassava, Coconut, Cloves, Coffee, Cocoa, Buffalo, Horse, Native Chicken
18	Tambak	Coconut, Clove, Coffee, Cashew, Kapok, Cocoa, Buffalo, Sheep, Pig, Free Range Chicken

D. Conclusion

Based on Location Question Analysis, there are main basic commodities included in the agricultural and plantation sectors in Gresik Regency, including green beans, rice, sweet potatoes, coconuts, sugar cane and cashew nuts. There are 2 economic sectors that act as basic or leading sectors in the economy of Gresik Regency. However, the minimal value of economic growth from this livestock sector and the slow pace of the livestock sector indicate that the level of competitiveness of Gresik Regency is still low.

E. References

Bendavid-V al, A vrom. 1991. Regional and Local Economic Analysis for th Practiticioners, 4 th edition, Praeger. New York.

BPS, 2023. Kabupaten Gresik Dalam Angka Tahun 2023. Badan Pusat Statistik Kabupaten Gresik.

Hendayana, R. 2003. Aplikasi Metode Location Qoutient (LQ) Dalam Penentuan Komoditas Unggulan Nasional. *Jurnal Informatika Pertanian*. 12. Balai Besar Pengkajian dan Pengembangan Teknologi Pertanian Bogor

Johnson, R.A. and D.W. Wichern. (2007). Applied Multivariate Statistical Analysis, Prentice Hall Inc, New Jersey.

Madeley, J. 2002. Food for All: The Need for a New Agriculture. Zed Books. London & New York.

Meyer, A.d., *et all*. 2005. Global Future: The Next Challenge for Asian Business. John Wiley & Sons (Asia) Pte Ltd. Singapore

Norton, G.W., *et al.,* 2006. The Economics of Agricultural Development : World Food Systems and Resource Use. Routledge. New York and London.

Ohmae, K. 2005. The Next Global Stage: Challenge and Opportunities in Our Boderless World. Pearson Education, Inc and Wharton School Publishing. New Jersey

Prahasta, E. 2009. *Sistem Informasi Geografis Konsep-Konsep Dasar (Perspektif Geodesi & Geomatika).* Bandung: Informatika.

Setiawan, Y. 2014. Analisis Spasial Penerapan GIS Dalam Pertanian, Universitas Brawijaya, Malang

Sofi, I. 2020. Analysis of Leading Sectors of North Penajam Paser Regency 2015-2019. Indonesian *Journal of State Budget and Finance (Akurasi),* 2(2), 112–130.

Sugiyono. 2011. Quantitative, Qualitative, and R&D Research Methods. Alphabet