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Agricultural Land Support For Food in Grogol in 2018

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ABSTRACT

Research on the carrying capacity of agricultural land for food is very important to do to determine the extent of the ability of the land to support the fulfillment of food needs of the population in an area. One of the problems in Grogol Subdistrict, Sukoharjo Regency is the tendency of land conversion that does not pay attention to production land for agriculture in order to meet the food needs of the population. This research includes 1 district which consists of 14 villages. The data used is secondary data taken from the Central Bureau of Statistics and the Agriculture Office of Sukoharjo Regency. The method used to determine the level of carrying capacity of agricultural land for food crops with the combined concept of the theory of Odum, Cristeiler, E Howard and Issard. The results showed that overall based on data in 2018 the carrying capacity of agricultural land for food in Grogol District was still low. This shows that the Grogol District area has not been able to be self-sufficient in food and has not been able to provide a decent life for its residents. Therefore, it is necessary to make certain efforts to increase the carrying capacity of food agriculture land in this area, for example by involving the population and utilizing the remaining vacant land

KEYWORDS

Agricultural land support
Self-sufficiency

1. Introduction

Grogol is a full denunciation nameon Sukoharjo district, Jawa Tengah. Located in sukoharjo's northern territory, limited to the city of surakarta. This area is a strategic area and has easy connecting access to the surrounding areas. Grogol territory used to be farmland, but with time and strategic location, it shifted into tourist areas, shopping malls, hospitality, hospitals, education and industry.

The development in grogol territory will certainly affect land function, particularly from non-developed land to arable land. As this region progresses it will affect the changing landscape by its shifting landscape. Current population mobility trends are also increasing toward cities as urban growth centers toward urban areas (grogol) or new growth centers (sadali, 2016).

What is to be expected is the disproportionate trend toward the production of land (food) agriculture, as this would upset the balance of the region in food demand (self-sufficiency). The decline in agricultural production in grogol region will affect the sustainability of the food demand of the population. In other words, the food security of the population would be compromised if the reforestation of the agricultural land was no longer considered.

In the context of the nation's development the matter of food is of great importance and strategic nature. Even food is an important pillar of national sovereignty, so food security gives a decisive measure of public well-being. Studies have shown that global food security has entered critical times, that food in many countriess is no longer able to provide food for people (2015 kurniawan & sadali).

Apart from the factors that control agricultural land functions, in the current emergency situation (covid-19) has significantly affected people's socioeconomic life, including food security. Governments need to consider the power of agricultural land and the readiness of food stock, including the availability of essential foodstuffs. The availability of sub systems is part of food security, which is directed to regulate sustainability and supply stability to ensure the food supply of each citizen ina

region. Thus, researchers are intrigued by the study of the availability of croply-producing land (rice) to understand the food security of all rural areas in grodistrict, sukoharjo district.

The study contibutes to analyse the power of agricultural land (food) support food security, particularly in Grogol territory. In order for food security in grogol territory to be known about its continuity, there will be an accounting for agriculture to see how much it can feed its people.

2. Method

A secondary data-gathering method involves utilizing data or documents produced by another. In the first quarter of this year, there was an increase in net sales in the second quarter of this year, he said. The data needed is the secondary data of the total population of grogol seed, the extent of the harvest in grogol district, the production of the crop (rice) of the grogol district. The area that is used as a research site is Grogol District, Sukoharjo Regency covering 1 District consisting of 14 villages with the consideration that the Grogol District area is one of the areas that carries out land conversion activities and is one of the sub-districts in Sukoharjo Regency, where Sukoharjo Regency is known as the central big rice producer for Central Java province.

1. 2.1. Data analysis techniques

The calculating technique for knowing the vast percentage of fields per village in grogol subdistrict is with the formula:

$$\frac{\text{the total area of rice fields per village}}{\text{the total land area}} \text{x } 100\%$$

Whereas the data analysis techniques for determining the rate of agricultural support are used in mathematical formulas from the combined concepts of odum, christeiller, ebenzer Howard and issard in soehardjo and 1990 kiran, which are:

$$\sigma = \frac{x}{k}$$

keterangan:

$$x = \frac{\text{harvested area (ha)}}{\text{population (soul)}}$$

$$k = \frac{\text{minimum physical requirements (kfm)}}{\text{food crop producation/(ha/yr)}}$$

As for the following operational definition:

a. The vast crop harvest is the large amount of land sown with rice within a year (ha)
b. The amount of rice produced in the region is taken from the amount of rice (kg) in each village.
c. Productivity is the result between the vast rice production and is stated in (kg/ha).
d. Minimum physical requirement (KFM) was an average rice consumption per person per year. KFM is used for calculating.KFM used in this study for 265 kilograms of rice/person/year.
e. One pound of rice is worth 2600 calories.
f. The number of people is the number of people in a particular year that is revealed in (the soul).
g. Land support is the land's ability to support the food demand of humans.
h. The optimum population (jpo) is the number of people that can be supported by existing agricultural yields in the region.
i. If the price of rice is not enough, the price of rice should be reduced.

According to moniaga (2011), that areas capable of sustaining food supplies are those that can meet the minimum physical needs of the population of 2600 calories/people/day or equivalent to 265 kilograms of rice/person/year. The region that could afford a decent living for its people dependent on food plants was either 650 kilos [650 kg] of rice or equivalent to 2.47.

The classification defined in the land carrying capacity is as follows:

Class I => 2.47 means that an area capable of self-sufficiency in food and capable of providing a decent life for its inhabitants.

Class II = 1 ≤ (≤ 2.47 means, areas that are capable of self-sufficiency in food but not yet able to provide a decent life for its inhabitants.

Class III = <1 means, areas that are not yet able to become self-sufficient in food.

3. Results and Discussion

In 2018, the area of Grogol District was recorded at 3000 hectares or around 6.43 percent of the area of Sukoharjo Regency. Parangjoro Village is the village with the largest area, namely 487 hectares (16.27%), while the smallest area is Grogol Village with an area of 85 hectares (2.83%). Grogol sub-district has 14 villages, each of which has a different land area and population. The total population of Grogol District in 2018 was 140,050 people (Table 1).The area of Grogol District consists of rice fields and non-rice fields. From the data in 2018, the rice field in Grogol District has decreased, namely 934 hectares. With details, Parangjoro Village is a village with the largest rice field, which is 296 hectares and Grogol Village is a village that still does not have rice fields (Table 2)

3.1 Area and Population

Table 1. Area, total population, population density by village in 2018.

LUAS, JUMLAH PENDUDUK, KEPADATAN PENDUDUK
DIRINCI MENURUT DESA TAHUN 2018

No	Desa	Luas Wilayah (Km2)	Jumlah Penduduk	Kepadatan Penduduk (Jiwa/Km2)
(1)	(2)	(3)	(4)	(5)
1	Pondok	2.92	9 419	3 226
2	Parangjoro	4.87	6 621	1 360
3	Pandeyan	3.64	6 074	1 669
4	Telukan	3.25	12 247	3 768
5	Kadokan	1.92	6 410	3 339
6	Grogol	0.85	5 485	6 453
7	Madegondo	1.44	10 382	7 210
8	Langenharjo	1.95	10 377	5 322
9	Gedangan	1.75	7 534	4 305
10	Kwarasan	1.16	9 338	8 050
11	Sanggrahan	1.84	11 204	6 089
12	Manang	1.43	6 670	4 664
13	Banaran	1.31	10 970	8 374
14	Cemani	1.67	27 319	16 359
JUMLAH		30.00	140 050	4 668
2017		30.00	138 654	4 622

Sumber Data : BPS Kab. Sukoharjo

The area of Grogol District in 2018 is 30.00 square kilometers / 3000 hectares. with a population of 140,050 people. The largest area is Parangjoro Village, which is 487 hectares and the smallest area is Grogol Village, which is 85 hectares. While the largest population is Cemani Village 27,319 with a density of 16,359 and the smallest population is in Grogol Village, namely 5,485 with a density of 6,453.

3.2 Rice field area

Table 2. Area of paddy field by Village in 2018

LUAS TANAH SAWAH DENGAN JENIS IRIGASI
DIRINCI MENURUT DESA TAHUN 2018

No	Desa	Irigasi Teknis	Irigasi 1/2 Teknis	Irigasi Sederhana	Tadah Hujan	Jumlah
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Pondok	50	0	10	0	60
2	Parangjoro	189	0	107	0	296
3	Pandeyan	119	0	80	0	199
4	Telukan	37	0	21	0	58
5	Kadokan	0	0	55	0	55
6	Grogol	0	0	0	0	0
7	Madegondo	0	6	0	0	6
8	Langenharjo	0	25	0	0	25
9	Gedangan	0	17	0	0	17
10	Kwarasan	0	45	0	0	45
11	Sanggrahan	0	73	0	0	73
12	Manang	0	62	0	0	62
13	Banaran	0	30	0	0	30
14	Cemani	0	8	0	0	8
	JUMLAH	395	266	273	0	934
	2017	395	266	273	0	934

Sumber Data : Cabang Dinas Pertanian Kecamatan

The results of the calculation of the percentage of rice field area per village in Grogol District in 2018. The calculation of the area of rice fields per village in Grogol District is the formula:

$$\frac{the\ total\ area\ of\ rice\ fields\ per\ village}{the\ total\ land\ area}\ x\ 100\%$$

Table 3. Area and percentage of rice fields in Grogol District in 2018

No.	Village Name	Rice area (Ha) 2018	Percentage of rice field area
1.	Pondok	60	6,4 %
2.	Parangjoro	296	31,6 %
3.	Pandeyan	199	21,3 %
4.	Telukan	58	6,2 %
5.	Kadokan	55	5,8 %
6.	Grogol	0	0
7.	Madegondo	6	0,6 %
8.	Langenharjo	25	2,6 %
9.	Gedangan	17	1,8 %
10.	Kwarsan	45	4,8 %
11.	Sanggrahan	73	7,8 %
12.	Manang	62	6,6 %
13.	Banaran	30	3,2 %

14.	Cemani	8	0,8 %
	Amount	934	

Data Sources: Calculation Results

The area with the largest rice field area is Parangjoro Village with an area of 296 hectares (31.6%) and the area with the smallest rice field area is Madegondo Village, which is 6 hectares (0.6%). Meanwhile, the area that does not have an area of rice fields (0 hectares) is Grogol Village.

3.3 Production and harvest area

High agricultural production is influenced by many factors, including soil fertility, the presence or absence of pest and disease attacks, good cultivation techniques and maintenance. Production and harvested area in Grogol District can be seen in Table 4.

Table 4. Production and harvest area in Grogol District in 2018.

No.	Village Name	Harvested area (Ha) 2018	Production 2018
1.	Pondok	147	8.750
2.	Parangjoro	858	8.779
3.	Pandeyan	592	8.829
4.	Telukan	174	8.752
5.	Kadokan	170	8.741
6.	Grogol	0	0
7.	Madegondo	18	8.777
8.	Langenharjo	73	8.958
9.	Gedangan	56	8.964
10.	Kwarsan	135	8.829
11.	Sanggrahan	220	8.840
12.	Manang	186	8.811
13.	Banaran	85	8.894
14.	Cemani	24	8.875
	Amount	934	114.799

Data source: District Agriculture Office Branch

3.4 Supporting Capacity of Grogol District Food Crops (Rice)

Number 68 of 2002 concerning Food Security which states that food security is a condition for the fulfillment of food for households which is reflected by the availability of sufficient food, both quantity and quality, safe, equitable and affordable. Food Security itself includes 3 aspects, namely 1.) Availability, that the available food is sufficient to meet the needs of the entire population both in quantity and quality and is safe. 2.) Distribution, food supply can reach all regions so that prices are stable and affordable for households.3.) Consumption, which means that each household can access sufficient food and is able to manage nutrition, health and preferences. Therefore, in order to meet the food needs of the population, the carrying capacity of agricultural land for food crops needs to be increased. Good carrying capacity of agricultural land will be able to meet the food needs of the community. If the carrying capacity of agricultural land for food crops is good, the welfare of the community and the food side is also good. On the other hand, if the carrying capacity of agricultural land for food crops is low, the fulfillment of food needs and community welfare is also low. The carrying capacity of agricultural land consists of:

1. The area of land for food crops required per capita for food self-sufficiency (K).
   The area of crop land required per capita for food self-sufficiency is a very important component in calculating the level of carrying capacity of agricultural land. The value of K is calculated by dividing the value of the minimum physical need (KFM) by the production of food crops per year which was previously in tonnes, converted into calories and then converted again into kg of rice for rice, while other commodities are not. The smaller the K, the better the carrying capacity of agricultural land. The area of food crop land required per capita for food self-sufficiency, the value always changes according to time and space because it is influenced by KFM and the ability of the land to produce food crops. For this reason, areas with high K values require efforts to reduce this figure by increasing the productivity of food crops or expanding the area of food crops.

2. Available crop harvest area per capita (X).
   Another important component in calculating the carrying capacity of agricultural land is the area of harvest of food crops available per capita (X). The value (X) is obtained from the area of plants in an area divided by the population in that area. The harvested area for this food crop value always changes both between regions and between times. This X value is the opposite of the K value, because the greater the X value, the better the carrying capacity of agricultural land in the area

The results of the calculation of the carrying capacity of agricultural land is provided in Table 5..

Table 5. Results of the carrying capacity of agricultural land in Grogol District in 2018.

No.	Village Name	Large Harvest (Ha)	Total population (soul)	Production of food crops (kg of rice)	Productivity of food crops (kg of rice)	X value	K value	Agricultural land carrying capacity
1.	Pondok	148	9.419	1.295.000	8.750	0,015	0,03	0,5
2.	Parangjoro	858	6.621	7.533.000	8.779	0,13	0,03	4,33
3.	Pandeyan	592	6.074	5.227.000	8.829	0,087	0,03	2,9
4.	Telukan	174	12.247	1.523.000	8.752	0,014	0,03	0,46
5.	Kadokan	170	6.410	1.486.000	8.741	0,026	0,03	0,86
6.	Grogol	0	5.485	0	0	0	0	0
7.	Madegondo	18	10.382	158.000	8.777	0,001	0,03	0,03
8.	Langenharjo	73	10.377	654.000	8.958	0,007	0,029	0,24
9.	Gedangan	56	7.534	502.000	8.964	0,007	0,029	0,24
10	Kwarsan	135	9.338	1.192.000	8.829	0,014	0,03	0,46
11	Sanggrahan	220	11.204	1.945.000	8.840	0,019	0,029	0,65
12	Manang	186	6.670	1.639.000	8.811	0,027	0,03	0,9
13	Banaran	85	10.970	756.000	8.894	0,008	0,029	0,27
14.	Cemani	24	27.319	213.000	8.875	0,0008	0,0298	0,02
	Average				0,847			

From the results of the research above, Grogol District in 2018, if detailed in 14 villages. Grogol sub-district has the carrying capacity of agricultural land, mostly in the low category. Which means that the agricultural land in the area is not yet able to provide a decent living and is not able to be self-sufficient in food. But it can also be seen that in 2018 Parangjoro Village has a land carrying capacity of 4.33 which can be categorized as Class I => 2.47 meaning, the area in Parangjoro Village is capable of food self-sufficiency and is able to provide a decent life for its residents and Pandeyan Village can be

categorized as Class II = 1 ≤ (≤ 2.47 means, areas that are capable of self-sufficiency in food but not yet able to provide a decent life for its residents. Classification of the level of carrying capacity of agricultural land in Grogol District 2018. From the results of calculations in the table of carrying capacity of agricultural land at the village level in Grogol District in 2018 (Table 5), the classification of the carrying capacity of agricultural land in each class can be seen in (Table 6) while the output map can be seen in Fig.1.

Table 6. Classification of agricultural land carrying capacity in Grogol District in 2018.

Class	The carrying capacity of agricultural land	Amount	Village
I	σ>2,47	1	Parangjoro
II	1≤σ ≤ 2,47	1	Pandeyan
III	σ<1	12	Pondok,Telukan,Kadokan, Grogol,Madegondo, Langenhajo,Gedangan,Kwarsan,Sanggrahan, Manang,Banaran dan Cemani

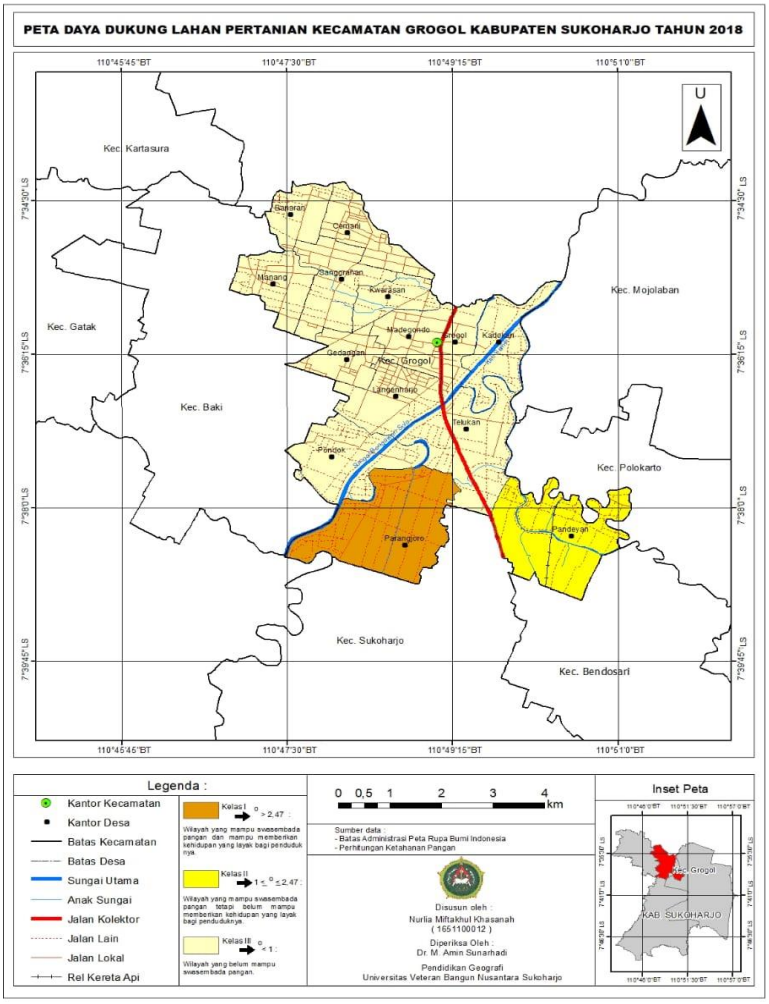

Fig.1 The Map of Agricultural Land Carrying Capacity In Grogol District In 2018

4. Conclusion

The largest area of agricultural land in Grogol District in 2018 is Parangjoro Village 296 hectares (31.6%) while the smallest agricultural land area is Cemani Village 8 hectares (0.8%) and the area of other village agricultural land is Pondok Village 60 hectares (6, 4%), Pandeyan Village 199 Hectares (21.3%), Telukan Village 58 Hectares (6.2%), Kadokan Village 55 Hectares (5.8%), Grogol Village 0 Hectares (0%), Madegondo Village 6 Hectares (0.6%), Langenharjo Village 25 hectares (2.6%), Gedangan Village 17 hectares (1.8%), Kwarsan Village 45 hectares (4.8%), Sanggrahan Village 73 hectares (7.8%) , Manang Village 62 Hectares (6.6%), Banaran Village 30 Hectares (3.2%)

The average carrying capacity of agricultural food land for population consumption in Grogol District, Sukoharjo Regency in 2018 was 0.847. This means that agricultural land in Grogol District in 2018 has not been able to carry out food self-sufficiency and has not been able to provide adequate food for its residents.

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