

Analysis of an Increase of Population Pressure toward Agricultural Areas in Galesong Sub-District, Takalar Regency

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Abstract

Overpopulation is still a big deal for every developing countries because it can lead to massive competition among societies in order to access education, occupation and health. Indonesia, one of the biggest population countries, 4th world population, are facing many challenges related to massive population. This study tries to analyze how population pressure influence the agricultural areas by scoring each parameter to gain population pressure value and the data was taken by observing all parameters. The result shows that the land use in Takalar Regency consisted of residents, rice fields, dry field and wetland. Over six years, agricultural areas declined from 2.253,12 to 2.215,7 and converted to built-up areas while population increased from 37.747 to 40.012. Furthermore, declining the agricultural areas and increasing population make the population pressure getting worse. As a result, only 2 villages of total 14 villages are able to fulfill their basic need while there are 12 villages unable to fulfill their basic needs due to declining the agricultural areas so that the food security becomes big issue.

Key words: Population pressure, Agricultural area

Introduction

Agricultural expansion involves intensive cultivation of land by utilizing advance technologies (Turner and Doolittle, 1978) in order to follow the massive population development. Sustained agricultural growth induces rural system transformation consisted of change in land use/land cover, cropping intensity, land, labor. The rural system is able to represent farmer's production and social behavior, (Ruttan, 1984).

Indonesia is one of the biggest population countries which estimate in 2019 around 267 million with annual growth 1,1%, (BPS, 2018). In line with population growth, there is also an increase in land needs to fulfill various development activities. Then on the one hand the availability of land resources, from the past until now has not changed, the extent is fixed and very limited. These two conflicting conditions will tend to increase population pressure on agricultural land. If this situation continues then at one time, agricultural land will decrease even though with increasing population, food consumption will also increase.

Takalar District, according to data from the Central Statistics Agency in 2015, is one of the regencies in South Sulawesi Province which has massive rapid population growth each year with a population density of 501 people / km². The population growth was due to urbanization as an impact of the expansion of the Makassar city area. In the one hand, this affected the increase in the number of housing, on the other hand, residential developers influence the housing which converted the agricultural area to built-up area, (Nurliah, 2013).

The population in Galesong sub-district has increased in four years around 39,525 people from 2011 to 2014, (BPS 2015). Meanwhile, the population pressures toward agricultural land are getting increased because agricultural areas in various regions can no longer be expanded especially in the Galesong sub-district which is in the west of the coastal area. On the other hand, a lot of agricultural land is converted into non-agricultural purposes for example for road system and residential area.

High birth rates and high life expectancy as well as urbanization as a result of the expansion of the urban area of Makassar (Nurliah, 2013) resulted in settlement expansion such as the construction of housing, offices and shops. Furthermore, the population pressure theory shown that all situation being equal. Increasing population density induces farmers to utilize their land more often by changing technologies, cropping time, cultivars and labor inputs in order to secure the minimal subsistence production of consumption crops and maximizing the strategies (Boserup, 1965; Chayanov, 1966; Turner et al., 1977, 1993). In addition, environmental obstacles such as soil salinity, drought, flood and poor land quality limit frequent cultivation of high demanding crops and reduce their yield, while stimulate the rural development, (Brookfield, 1972; Brush and Turner, 1987, 1993).

Land use in Galesong consisted of settlements which in 2000 was 181.35 ha while in 2014 was 527,03. Over 14 years, there is an increased around 345.68 ha. This needs to be done by reviewing and collecting a number of data related to the reduction of rice fields which will be accumulated in Otto Sumarwoto's formula to find out whether the pressure level of the population in Galesong has exceeded the threshold, so that it can be used as indicators for policy makers to issue the building permits related to regional regulation No 6 of 2012 concerning the Takalar Spatial Planning in issuing the conversion of agricultural land. About 56% or 9,929 Galesong people work as farmers, (Galesong in 2015 figures). But every year rice fields are decreasing due to the expansion of settlements. This also causes Galesong to be the most sub-district with a number of poor families in Takalar estimated around 5,592 (BPS 2013).

The purpose of this study was to determine the availability of agricultural land in Galesong sub-district, Takalar district and also to find out the process of population pressure and its relation to agricultural land in Galesong sub-district, Takalar district.

Study Area

The research location takes place in all villages in the Galesong sub-district. The area of Galesong District is 25.93 km² consisting of 14 villages namely Bontoloe, Kalenna Bontoloe, Bontomangape, Parangbambe, Pattinoang, Boddia, Parangmata, Galesong Kota, Galesong Baru, Pa'lalakkang, Pa'rasangang Beru, Kalukuang, Campagaya, and Mappakalampo. The following figure show the study area.

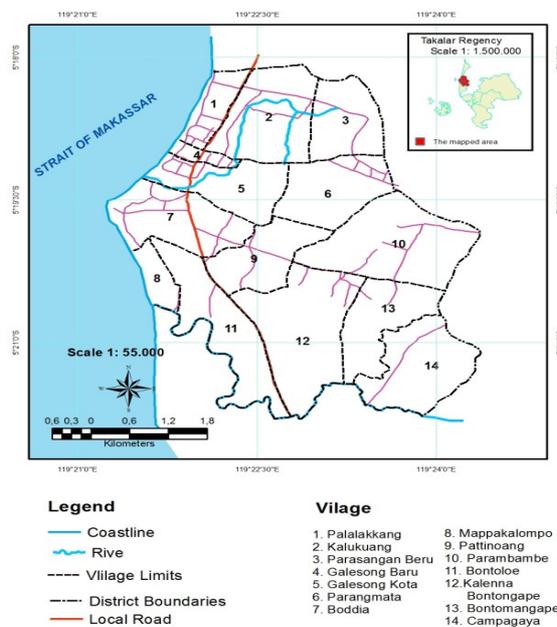


Figure 1. Study Area

Methods

The research was conducted with a quantitative descriptive approach method by compiling and analyzing the data as well as evaluating based on scoring. In this study, the parameters consisted of demographic data, the number of farmers and land use. In addition, all parameters was analyzed by scoring them in order to find the level of population level. The formula to calculate the level of population pressure based on Otto Soemarwoto (1985).

$$TP = Z (fpo(1+r)^t) / L$$

TP	: Population pressure
Z	: Minimum land area for decent living
f	: The fraction of the population living as farmers
Po	: Number of residents time
R	: Annual population growth rate
T	: Calculation time period
L	: Area of agricultural land

Population Pressure Value (TP) for land then classified into three categories based on Regulation of the Director General of Land Rehabilitation and Social Forestry Number: P.04 / V-SET / 2009 consisted of:

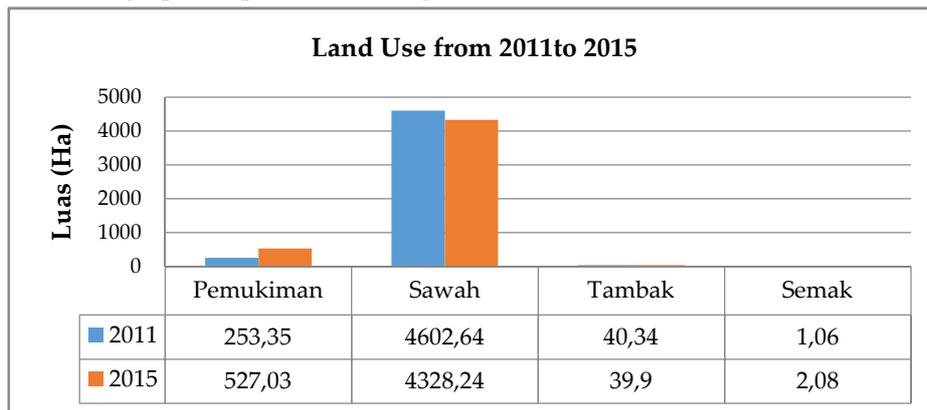
Table 1. Category of Population Pressure

Value	Categories	Score
< 1	Good/low pressure	1
1-2	Moderate/light pressure	3
>2	Bad/high Pressure	5

Result

Land Use

Land use in Galesong District in 2015 is the same as land use in 2011, only its area has changed. Where in 2011 there was an increase or expansion of settlements from 253.35 ha to 527.03 ha in 2015 and conversely there was a decrease in the area of agricultural land in 2011 covering an area of 4602.64 ha to 4328.24 ha in 2015 while using shrubs and ponds no significant changes occurred. For more details, here is a graphical picture of changes in land use in 2011-2015.



Population Pressure

The results of the calculation of population pressure for each village in Galesong District indicate that the village with the highest pressure level or bad category is Campagaya with TP values. 7.26 followed by Galesong Kota and Palalakkang with TP values. 6.66 while Galesong Baru with TP value. 5.47 continued Pattinoang with TP value. 5.28 followed by Kalenna Bontoloe with TP values. 4.14, Parasangan Beru with TP values. 3.59 further Parangmata with TP value. 3.54, Mappakalompo with TP value. 2.82 followed by Bontoloe with TP values. 2.79 continued Boddia with TP values. 2.40,

Parambambe 2.28 then the village with a moderate pressure level namely Kalukuang with TP values. 1.62 while Bontomangape with TP values. 1.22.

Based on the above results it can be seen that the population pressure on agricultural land in most of Galesong Sub district is above the threshold ($TP > 1$), meaning that the existing population exceeds the carrying capacity of the land to meet food needs. Almost all villages have been under high pressure with a value of $TP > 2$. However, there are still some villages that have TP 1-2 values, so they have not exceeded the pressure threshold, but the numbers shown are also close to 2 or exceeding the limit, so that although it has not exceeded the threshold but also cannot help other regions.

This population pressure occurs due to the increasing number of population every year which is unstoppable so that there is an expansion of settlements and one of the effects is the decline in the area of agricultural land.

Table 2. Farmers and Population Pressure of Galesong

Village	Farmers (%)	Score of Population Pressure	Categories
Bontoloe	13	2,79	Bad
Kalenna Bontoloe	22	4,14	Bad
Bontomangape	16	1,22	Moderate
Parambambe	17	2,28	Bad
Pattinoang	30	5,28	Bad
Boddia	10	2,40	Bad
Parangmata	33	3,54	Bad
Galesong Kota	16	6,66	Bad
Galesong Baru	18	5,47	Bad
Palalakkang	22	6,66	Bad
Parasangan Beru	32	3,59	Bad
Kalukuang	12	1,62	Moderate
Mappakalompo	8	2,82	Bad
Campagaya	43	7,26	Bad

Table 2 shows that the total of 14 villages in Galesong Sub district there are only two villages in the medium category while the other twelve villages are already in the poor category or agricultural production is no longer able to meet the needs of the population.

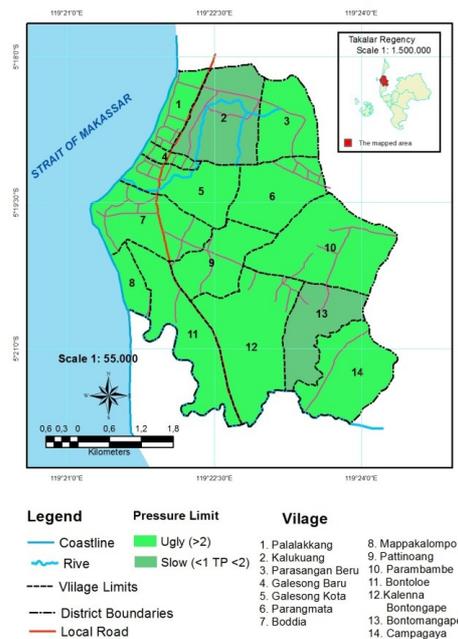


Figure 3. Distribution of Population Pressure in Galesong

Discussion

Population pressure on agricultural land in most of Galesong Sub district has been above the threshold (Population Pressure Category > 1) meaning that the existing population has exceeded the carrying capacity of the land to meet the food needs. Almost all villages have been under high pressure with a value of Population Pressure Category > 2 . However, there are still some villages that have Population Pressure Category 1-2 values, so they have not exceeded the pressure threshold, but most shown close to 2 or exceeded the limit although the two villages have not exceeded the threshold, they however are not able to support other regions in supplying the basic needs.

Furthermore, it can be identified that population growth in some areas can be reduced by further enhancing family planning programs with involving the role of community leaders and non-formal leaders. Other programs that can decline the population pressure on agricultural land is to create employment outside the agricultural sector so that residents prefer to find other job instead of converting the agricultural area continuously. Maintenance of large livestock, among others, cows and the like in addition to increasing income, animal waste can be used for manure that can fertilize agricultural land.

From the discussion above shows that from a total of 14 villages in Galesong Sub district there are only two villages that can meet the food needs of the rice category with the population, but neither of these villages is sufficient for other areas because the pressure value is almost close to the bad category. This reflects the imbalance between the population and the rate of growth with the availability of agricultural land. According to the Takalar District Central Bureau of Statistics in 2013, it was shown that out of nine sub-districts in Takalar District, Galesong District collected the highest number of poor families.

Conclusion

Agricultural land in Galesong Sub district is not sufficient for basic needs due to the reduction in productive land due to expansion of settlements while population pressure occurs due to population growth. The highest population pressure or bad category is Campagaya with Population Pressure Category values. 7.26 (> 2) then the village with a moderate pressure level namely Bontomangape and Population Pressure Category value. 1.22 (< 2).

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