The effect of Kalimantan Institute of Technology on land use change in Karang Joang

A S Rahajeng¹, M R Pratama

¹Urban and Regional Planning Department, Kalimantan Institute of Technology, Soekarno Hatta km 15 Balikpapan, East Kalimantan, Indonesia.

Abstract. Placement of a university in an area can be one of the attractions for people in the city and also for people outside the area. This activity will certainly trigger the development of other activities as a form of support for educational activities and it will be affected the numerous changes in land use. This study aims to determine the effect of the presence of the university to land-use changes in surrounding Kalimantan Institute of Technology. This research is a quantitative approach with a descriptive analysis, that used to analysis activity system that supports educational activities and land use change. From 2015 until 2018 there are 512 new buildings that change from cultivated land to residential, industrial, transportation and also trade and service, only 19% of them that appear to meet the needs of students, such as a boarding house, rent houses, stationery stores, restaurants, and grocery stores. In order to anticipated the effect of uncontrolled development for the community, it needs to increase the public awareness to build with the proper conditions and based on the regulation, and for the government is the existence of government regulations especially on building permits.

1. Introduction

Based on regional space order plan (RTRW – Rencana Tata Ruang Wilayah) of Balikpapan for the period 2012-2032 [1], Karang Joang urban village in North Balikpapan being center for education area. One of the higher education facilities in Karang Joang is Institut Teknologi Kalimantan (ITK) located on Jalan Soekarno Hatta km 15. ITK encompasses 60 out of the 300 ha of land owned by ITK and started to operate in 2015. The development of the university then leads to changes in land use that is characterized by the growth of support activities that respond to the needs of the students, as a result of the unavailability of these activities by the university. Based on this research, it is known that the effect of the presence of the university cause a significant change land use from non-built area land into built area. In accordance with the market mechanism, the increase in demand for land while the supply of land is perfectly inelastic will result in an increase in land prices[2].

The development of the education facility also can be attractions not only for the people in the city but also for the people outside the area that come to Balikpapan to study in ITK. This case will be increasing population density and also will increasing population density and also the provision of land. Regions with higher education facilities will need supporting facilities such as a house, boarding house, rent house, stationery store, restaurant, and grocery store. The high demand for land will be raising the land price because based on the supply side of the land area, the demand is increasing. Besides in terms of land competition, an activity can have an influence on land prices in terms of infrastructure
development and an improvement in the physical condition of the area that adds value to the surrounding land [3]. From 2015 up to 2019, there are increasing the number of building along Sungai Wain district. The number of students will increase in the following years and this is directly proportional to the needs of providing supporting facilities, these opportunities can attract the interest of community businesses to invest in Karang Joang.

To realize the principle of spatial planning, namely the use of space in an integrated, effective, efficient, harmonious, balanced, sustainable, openness, equality, justice and law enforcement in accordance with the spatial planning, it is necessary to carry out sustainable use of space with an environmental perspective. The construction of educational support facilities such as boarding houses and store has led to land conversion activities from non-built land into built-up areas, and change the area which was originally designated as a green open space into a built area. Potency of land use changes in the type of land use not built (rice fields, gardens, shrubs and soil) need to be anticipated so that spatial violations what happens later on can be prevented and dealt with immediately [4]. The uncontrolled land-use change will be impacted to uncontrolled urban development and it must be anticipated through policy and supervision. The purpose of this study is to determine the effect of the existence of ITK on land-use changes that will have an impact on the physical changes of the surrounding area. This research is expected to provide an understanding of the influence of an educational area on land use in the surrounding area so that it can be used as a basis for anticipating uncontrolled conversion of land.

2. Methodology
This research uses a quantitative approach, to identify the impact of ITK on land-use change in Karang Joang radius of approximately 3 km from ITK. This research is quantitative with a descriptive approach that analysis land-use changes during the period of 2014-2019 and analysis the distribution of land-use change. Type of land-use change will be the focus in this research is land-use that support education facility such as a boarding house, rent house, shop, minimarket, game center, restaurant, etc.[5]. A survey and site visit is required to get current information about the present situation and condition of the research area. The current information about the research area was gathered by daily observation during six-month (from March to May 2019). Interviews have made with government officers, and representatives from the surrounding communities as well as about the land-use change.

![Figure 1. Research area.](image-url)
3. Result

Balikpapan is located in East Kalimantan with 645,727 population [6] and according Minister of Settlement and Regional Infrastructure Decree No. 534 / KPTS / M / 2001 about Minimum Service Standards Guidelines for Determination of Minimum Service Standards in Spatial Planning, Housing and Settlements and Public Works, big city with total population 70,000 people must have at least one facility of education. Regional Space Order Plan (RTRW – Rencana Tata Ruang Wilayah) of Balikpapan for the period 2012-2032 mentioned that Karang Joang urban village in North Balikpapan being center for education and religious area. There are three higher facilities of education in Karang Joang, there are Balikpapan State Polytechnic, School of Oil and Gas Technology Balikpapan and also ITK. Planned to be built on 300 hectares, ITK starts operating in Balikpapan since 2015 and until 2018 there are 2,646 students. The increase in students each year make supporting needs also increasing. This is caused land-use changed in Karang Joang from open space to a new building. Figure 2 showed land use in Karang Joang before ITK operated, that dominated with forest and agriculture land, also there are manufacture, office, residential, and open space. This research focuses on a radius 3 km from ITK’s facility after its operated, and the result in figure 3 shows that the number of the building was increasing during that period, 552 new buildings built from 2014 to 2019. New buildings in Karang Joang consist of counter, dormitory, machine shop, lumberyard, office, rented house, boarding house, mosque, grocery store, bakery, barnyard, security post, boarding school, house, restaurant, etc. From figure 4, 81.7% are houses, 6.7% are boarding houses and 2.7% are rented houses. From all of the new buildings, only 82 buildings or 1,397 ha that changed from open space to facilitate that support needs of education facilities such as a rented house, boarding house, grocery store, machine shop, bakery, restaurant, mosque, and counter. It means from all land-use change in 5 years, only 19% that use as supporting facility for ITK to meets the needs of students, lecturers, and staff.

![Figure 2. Land Use Map of Karang Joang.](image1)

![Figure 3. New building from 2015 to 2019 In Karang Joang.](image2)

New buildings in Karang Joang consist of counter, dormitory, machine shop, lumberyard, office, rented house, boarding house, mosque, grocery store, bakery, barnyard, security post, boarding school, house, restaurant, etc. From figure 4, 81.7% are houses, 6.7% are boarding houses and 2.7% are rented houses. From all of the new buildings, only 82 buildings or 1,4347 ha that changed from open space to...
facilitate that support needs of education facilities such as a rented house, boarding house, grocery store, machine shop, bakery, restaurant, mosque, and counter. It means from all land-use change in 5 years, 19% of them used as supporting facility for ITK to meets the needs of students, lecturers, and staff.

According to figure 5, land use that support educational facility dominated with rented house and boarding house. There are two boarding houses built in 2015 after ITK was operated, there 37 buildings as the highest number of building additions in 2017 but in 2018 only there are 13 new buildings (figure 6).

4. Discussion
Based on the analysis, the impact of the existence of ITK on land-use change is an increase in the provision of trade areas and services that support educational facility including boarding houses, rented houses, grocery store, bakery, restaurants, and also dorms, but the number of its building is not significant compared to all of the land-use change. The number of facilities that support educational higher facility just 19% of all land-use change in the research area. Even in 2018 and 2019 there are decreasing of new building numbers compared to 2017 up to 65%. The result of the research shows that the main propose of land-use change in the research area is still about how to provide the community
needs such as housing that dominated the land-use change up to 68.17%. According on regional space order plan (RTRW – Rencana Tata Ruang Wilayah) of Balikpapan for the period 2012-2032 [1] land designation in Karang Joang accordance with the policy, that will dominated with educational facility but for the community, 55.28% of land-use in Karang Joang is open space that contains agriculture and forest and it needs to increase public awareness to build with the proper conditions and based on the regulation even the land-use change didn’t become the main issue for now but the government has to concern about land-use change.

5. Conclusion
The effect of ITK in the land-use change to order supporting the educational area is not significant, only 19%. Houses are the biggest number of land-use change, second is rented house and then boarding house. Land use that supports the educational facility especially ITK are rented house, boarding house, grocery store, machine shop, bakery, restaurant, mosque, and counter.

6. References
[1] Anonim 2012 RTRW Kota Balikpapan Tahun 2012-2022.
[2] Drejer, I 2003 Input–Output Based Measures of Denmark: Aalborg University.
[3] Ramadhoni, K & Rudiarto, I 2014 Pengaruh Eksistensi Kawasan Pendidikan Unnes Terhadap Perkembangan Guna Dan Harga Lahan Di Sekaran, Kota Semarang Jurnal Teknik PWK 3 No 4.
[4] M E N Sasono & C Susetyo 2018 Analisis Potensi Perubahan Pemanfaatan Lahan Berdasarkan Model Spasial Harga Lahan di Kecamatan Tembelang Kabupaten Jombang JURNAL TEKNIK ITS 7 No 1.
[5] Amirudin, A 2014 Pengaruh Keberadaan Universitas Haluoleo Terhadap Perubahan Tata Guna Lahan Tata Guna Lahan Di Kawasan Andonuohu Kota Kendari JURNAL WILAYAH DAN LINGKUNGAN 2 No 1, p 73-88.
[6] BPS 2018 Balikpapan dalam Angka 2010-2017 Balikpapan : BPS Kota Balikpapan.