Priority study of infrastructure development at Suburban Pekanbaru (Case study: Tambang District)

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Abstract. The problems in the field of infrastructure are the main problems in the suburban of Pekanbaru, making it difficult to determine the priority of infrastructure development most needed by the community. The Analytical Hierarchy Process method and weighting of variables in priority setting are used in infrastructure development. The results of this study indicate that the average development of infrastructure is 20.75%. The priority of infrastructure development is road network (0.165), housing (0.095), educational facilities (0.089), economic facilities (0.086), health facilities (0.075), clean water (0.074), bridges (0.067), electricity grids (0.066), telecommunications network (0.059), government facilities (0.049), garbage and drainage facilities (0.042), and sports facilities (0.041).

1. Introduction
Peri-urban area is an area that is located between two regions that are very different in their environmental conditions, its between regions that have urban appearance on one side and areas that have a rural appearance on the other. Because urban and rural areas have such complex dimensions of life that generally show different attributes, then in this area, special attributes emerge which are hybrids of both [1].

Pekanbaru City, which is known as the center of trade and services, the center of government, and other centers of activity have always evolved over time. This continuous development has resulted in areas that are directly bordering the city of Pekanbaru, which have been heavily influenced by the city (urban sprawl). There are many suburbs of Pekanbaru City, its bordered by three regencies; Kampar, Siak and Pelalawan. Tambang District is part of Kampar Regency, directly adjacent to Pekanbaru, is one of the suburbs of Pekanbaru. That has been affected by the development of Pekanbaru. The selection of this area to become a research area based on the scope of the area that was predominantly affected by the development of Pekanbaru. It was based on the limitations of researchers to conduct an overall study of the area included in the suburbs.

Tambang District is a suburban area in many different developments with the center of Pekanbaru. The distance between these two regions is very close, limited by the administrative boundary gates of the two regions. Problems have arisen, ranging from issues of settlements, infrastructure, facilities and infrastructure, human resources and so on, apart from the location of the sub-district which is directly adjacent to the City of Pekanbaru, this area is also located on the national crossing route of Riau-West Sumatra. A lot of growth magnets and centers of activity will make growth in this area increase. Problems in the infrastructure sector are the main problems in this region. According to data from the
Tambang District Statistics Agency in Figures 2014 [2], exposure to data on the development of built land and infrastructure development in the suburbs of Pekanbaru shows differences in development with Pekanbaru City, from the land use data of only ± 10,000 Ha of land that is still untapped. And from data on facilities and infrastructure, one of the roads is ± 100 km of roads that are still in a damaged condition. As well as other problems such as slums and so on. Therefore, researchers are interested in conducting research in this area in order to find out what infrastructure is the priority of development in this area in order to develop a sustainable area or more commonly known as “sustainable city”. While for the purposes of this study are as follows: (i) Identifying infrastructure developments in the suburban of Pekanbaru; (ii) Analyze the priority level of infrastructure development in the suburbs and Pekanbaru; (iii) Formulating infrastructure development strategies in the suburban of Pekanbaru in order to create sustainable development.

2. Methods

The method used in this research is:

1. Identification of Infrastructure Development in the Suburban of Pekanbaru City

The method used is the descriptive quantitative-qualitative method, this research is obtained from the observations and existing secondary data. Then it is explained to describe the conditions and what are the infrastructure in the research area. In addition, at this stage also describes the development of infrastructure with see its development from the period or span of 5 years of development. The assumption of taking this method is obtained in accordance with the development period of an area for 5 years. Infrastructure developments were taken from 2003, 2008 and 2013.

2. Analysis of the Priority Level of Infrastructure Development in the Suburban of Pekanbaru City

Two methods are used the quantitative-qualitative descriptive method. This stage begins with sampling which is considered expert or there is a relationship with the research area. Offices who are respondents in the Tambang District are: Regent's office, District office, Development Planning Agency, Departemen of Public Work, Promotion and Investment Agency and Academics. An analytical hierarchy process (AHP) questionnaire was used distribute to the expert sample. Data from the questionnaire will be used as input for the AHP analysis using expert choice software, then processed to obtain a value that describes the priority level of the infrastructure development and then explained descriptively. AHP is a retrieval technique decisions developed for cases that have various levels of (hierarchy) analysis.

3. Formulating Infrastructure Development Strategies in Pekanbaru Suburban.

The method used is descriptive qualitative method with SWOT analysis. In formulating these efforts and strategies based on local government policies, infrastructure development priorities, and field conditions. SWOT is a tool that can be used for qualitative analysis. This analysis can be based on logic that can maximize strengths and opportunities, but simultaneously can minimize weaknesses and threats (Rangkuti, 2001 in [3]).

3. Result and discussion

3.1. Identification of infrastructure development

The highest development of infrastructure is economic facilities, which reached 54% from 2003 to 2013, while infrastructure which experienced a decline in development was health advice, where from 2003 to 2013 its development decreased by 17%. The average infrastructure development in Tambang District from 2003 to 2013 was 20.75%.
Table 1. Development of infrastructure in Tambang District (year 2003-2013)

| Infrastructure        | 2003 | 2008 | 2013 | Development | % |
|-----------------------|------|------|------|-------------|---|
|                       |      |      |      | Average     |   |
| Education Facility    | 70   | 86   | 90   | 2           | 8 |
| Economic Facility     | 105  | 218  | 599  | 49,4        | 54|
| Health Facility       | 25   | 20   | 15   | -1          | -17|
| Worship Facility      | 150  | 152  | 142  | -0,8        | -2|
| Sport Facility        | 84   | 86   | 84   | 0           | 0 |
| Road                  | 21   | 38   | 40   | 1,9         | 19|
| Electric              | 2378 | 7675 | 16011 | 1363,3      | 52|
| Bridge                | 141,5 | 321  | 435,5 | 29,4        | 33|
| Clean Water           | 6250 | 8786 | 16743 | 1049,3      | 33|
| Housing               | 5439 | 8786 | 16743 | 1130,4      | 37|
| Telecomunication       | 5238 | 5240 | 12478 | 724         | 32|
|                       |      |      |      | Average     | 20,75 |

Source: Analysis, 2015

3.2. Analysis of priority levels of infrastructure development

The first step in this analysis is to determine the structure of the hierarchy. This hierarchical structure consists of five levels.

- **Level 1** is the main objective; the Priority of Infrastructure Development in Tambang District; **Level 2** is a supporting factor for achieving the main objectives: Physical Factors, Social Factors, Economic Factors;
- **Level 3** is a criterion relating to each factor, consisting of: Land Use, Environment, Population, Community Activities, Regional Benefits, Procurement Costs;
- **Level 4** is a sub-criteria which is a derivative of the previous criteria, which consists of: Land Availability, Land Value, Environmental Quality, Environmental Impact, Population Growth, Increased HR, Labor, Community View, Community Behavior, Community Income Level, Regional Development, Regional Original Income (PAD), Mutiplier Effect, Government Costs, Investment, Maintenance cost;
- **Level 5** is an alternative that is the choice in the priority of infrastructure development in Tambang District.

For more details can be seen in Figure 1. Furthermore, weighting is carried out on: Factors, Criteria - Sub Criteria, and Alternatives.
The results of the Infrastructure Development Priority Level are: (1) Road, weight of 0.165; (2) Housing, weight of 0.095; (3) Education Facilities, weights of 0.089; (4) Economic Facilities, weight of
0.086; (5) Health facilities, weights of 0.075; (6) Clean water, weight of 0.074; (7) Bridges, weights of 0.067; (8) Electricity, weight of 0.066; (9) Worship facilities, weights of 0.059; (10) Telecommunication, weight of 0.051; (11) Government facilities, weight of 0.049; (12) Solid waste and drainage facilities, weight of 0.042; (13) Sports facilities, weights of 0.041.

3.3. Formulating infrastructure development strategies in Pekanbaru Suburban

The following are formulated Strengths, Weaknesses, Opportunities and Threats:

1) Strength (S):
   1. Tambang District located in the suburban of Pekanbaru,
   2. Land supports broadly,
   3. The existence of a regional cooperation program for Pekansikawan,
   4. The policy of the Kampar Regency government towards the Tambang District,
   5. The potential of extensive agricultural and plantation land,
   6. The development area in the national scale education area,
   7. Development area is located on a national road crossing.

2) Weakness (W):
   1. Land in the development area in the form of peat land,
   2. Quality of human resources is still low,
   3. Land use is low,
   4. The pattern of research area is not organized.

3) Opportunities (O):
   1. Support from the policies of the Kampar Regency government through RP2KP (Settlement Area Development and Development Plans)/Urban Settlement and Infrastructure Development Strategies (SPPIP) and RPJMD,
   2. Regional-scale Regional Cooperation,
   3. Government Transparency in Accepting Investment,
   4. Communities heterogeneous.

4) Threat (T):
   1. Land conflict with the community,
   2. Degradation and deterioration of the quality of the environment,
   3. Accumulation of development on the outskirts of the city,
   4. The rapid use of land tends to ignore the spatial plan.

Based on the results of the analysis that has been carried out and is based on the priority objectives of infrastructure development in the suburban area of Pekanbaru, the suburban area development strategy is described as follows:

1. Utilizing the position of the Tambang District to attract infrastructure development investors ($1,S2,S3,S4-O1$).
2. Utilizing large areas of land to support development in the research area ($S2-O2$).
3. Utilizing support from the government through development policies by promoting the region ($S4-O3,O4$).
4. Utilizing the potential of the Tambang District to attract domestic and foreign investors for infrastructure development ($S1,S2,S5,S6,S7-O2,O3,O4$).
5. Utilizing government support to handle land in less optimally by repair and so on ($W1-O1$).
6. Enhancing and developing regional cooperation between regions in order to create competent human resources in managing development in the development area ($W2-O2,O4$).
7. Utilizing the openness of the government in accepting investments to make land use in regional development ($W3-O3$).
8. Creating an organized pattern of regional space with the support of diverse communities and support from the government ($W4-O4$).
9. Utilizing community and government cooperation to minimize conflict between government and society (S3–T1).
10. Utilizing infrastructure development to create environment so that degradation and degradation of environmental quality can be overcome (S2,S3,S4–T2).
11. Use of inter-regional cooperation to create a pattern of space and land use in accordance with the development plan (S2–T4).
12. Promote collaboration between government and society to avoid conflict (W2,W3–T1).
13. Using an environmentally friendly development system to minimize environmental degradation (W3–T2).
14. Utilizing vast land to create infrastructure development that is in accordance with the needs of the community (W3,W4–T3,T4).

4. Conclusion
Based on the results of the discussion on the priority study of infrastructure development in the suburban of Pekanbaru (Case Study:Tambang District, Kampar Regency), it can be concluded:

1. Infrastructure Development in Tambang District
   Most of the infrastructure development in Tambang Subdistrict has always experienced an increase, which is quite significant is the Economic facilities, up to 54%, while the facilities that have decreased are health facilities have decreased by 17% and the facilities of worship decreased by 2%. The average development of infrastructure in Tambang District from 2003 to 2013 was around 20.75%.

2. The Priority Level of infrastructure development in Tambang District is the road, housing, facilities: education, economic, health, clean water, bridges, electricity, worship facilities, telecommunications, government facilities, waste and drainage facilities and sports facilities.

3. The development strategy of the Tambang District which is suitable to be applied in this region is the development of sustainable areas. This is in accordance with the location of the area that is very possible to do this. Sustainable development must be adjusted to the development plan that has been prepared by the government. As has been known this area has been included in the Settlement Development and Development Plan (RP2KP) by the district government Kampar. Of course the plan must be supported by other aspects such as transportation, electricity, clean water, sanitation and so on. This is so that development can be well organized and in accordance with the agreed Regional Spatial Planning (RTRW). Another strategy in the development of this region by utilizing regional cooperation between the areas of the Tambang Subdistrict and the City of Pekanbaru, can be in the form of cooperation in the provision of infrastructure development and so on. In this case both governments must sit together and make an agreement in the form of a Memorandum of Understanding (MOU) so that sustainable and sustainable development will be created.

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