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Abstract

Space planning in Indonesia at national, province and regency/city scopes is concentrating more upon the use of regional administrative boundaries. Regional space order is strictly highlighted due to the excessive occurrences of floods during rain season and also the disaster of drought in dry season. Partial approach pattern and less understanding on ecosystem have led to less optimum planning. Future planning must consider the approach that takes account ecosystem and environment. Such approach shall determine the boundaries of River Stream Region (DAS). This research attempts to review the policy aspect in space order planning and also in water resource management. The objective of this review is to provide a description about challenges and prospects encountered by space restructuring with river stream region approach.

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Result of research indicates that challenges and prospects in determining the boundaries of planning region, substance, interregional participation, cross-sector engagement, and development program design are mostly positive. Planning with river stream region approach is expected to produce more optimum policies, because these may be useful to indicate the conditions of river stream region such as landslide, erosion, sedimentation, flood and drought which typically characterize the regions along river stream region.

Keywords: Space restructuring; Approach; River Stream Region (DAS).

1. Introduction

Regional space order is a serious problem in recent days. Physically, regional space development is always followed by the increasing width of the built region. Population growth and economical activities in one side, and land scarcity, in other side, have forced the consideration of efficiency in space utilization becoming inevitable. In this context, various policies for the development of housings, industries, road networks, tap water networks, public facilities, or green path, are structures and infrastructures needed for space order development [1]. The products of space restructuring have been suspiciously attended due to unexpected occurrences such as drought during dry season and flood during rain season. Regions previously buffered from flood and drought hazards are nowadays quite vulnerable to both. Natural phenomena have shifted. If space usage is incorrectly structured, carelessly planned, improperly utilized and unwisely preserved, it leaves negative image onto the surrounding environment [2].

The utilization of resources at river stream region without complying with sustainable development principle will adversely influence ecosystem. Development activities at river stream region may influence resource productivity with production processes and residues. Diversity in how to use resources at river stream region can cause a conflict with reciprocal impact. The use of resources at river stream region for national development goals may be successfully better under integrated management (Integrated Coastal Zone Management, ICZM) [3].

Therefore, better planned space restructuring can be produced. Space restructuring in Indonesia still emphasizes on the boundaries of national, province, and regency/city scopes, especially by underscoring administrative boundaries. The goals of space restructuring are 1. to produce a harmony between natural environment and man-made environment, 2. to integrate the use of natural resource and man-made resource by giving attention to humanity interest; and 3. to protect space function and to prevent negative impact of space utilization on environment.

It is also said that in space restructuring, the regional space order plan for regency is considering 6 substances, such as: 1. Goals, policies and strategies of regional space restructuring for regency; 2. The plan of regional space restructuring for regency that involves connecting urban system to rural system and establishing structure network system at regency level; 3. The plan of regional space

pattern for regency that includes regency-based protected region and regency-based cultivation region; 4. The determination of strategic region in regency; 5. The direction of how to utilize regional space in regency that considers middle-term program for five-year schedule; and 6. The control over regional space utilization in regency based on the general rules of zoning, permit, incentive and disincentive, and sanction [4].

Space division approach can be used based on function, activity, and administrative aspects. Space must be seen as a unity used for people wealth that must be preserved properly. Therefore, space restructuring must combine between administrative boundaries and river stream region boundaries to produce the integrated approach that gives attention to the boundaries of environment and ecosystem of a region.

2. Method

Research reviews policies related to space restructuring and water resource management. Descriptive approach is used and case study is considered. As said by [5], descriptive research is a research design aimed to describe the existing phenomena, including natural or man-made phenomena. These phenomena include shapes, activities, characteristics, changes, relations, similarities and differences between one phenomenon and another. According to [6], descriptive research is describing a symptom, variable or condition as it is.

3. Result and Discussion

Space restructuring essentially involves several approaches: 1. Space restructuring based on system comprises of regional system and urban internal system; 2. Space restructuring based on main function of the region includes protected region and cultivation region. Space restructuring based on administrative region involves establishing national, province and regency/city boundaries; 3. Space restructuring based on regional activities consists of space restructuring for urban region and rural region; 4. Space restructuring based on regional strategic values comprises of space restructuring for strategic regions at national, province and regency/city levels. The classification of Indonesia space restructuring is made by considering administrative region boundaries.

3.1. Planning based on Strategic Region Boundaries

Strategic region can be determined within the scopes of national, province and regency/city (Figure 1). Strategic region represents a region where within it there are activities with great impact on: 1. Spatial order of the surroundings; 2. Other activities in similar kind field or in other field; and/or 3. The improvement of people welfare.

The determination of strategic region is also made with several interests such as: 1. Defense and security; 2. Economic growth; 3. Social and culture; 4. Natural resource utilization and/or highly advanced technology; and/or 5. Function and support capacity of life environment.



Figure 1: Strategic Region Boundaries

Space restructuring for strategic region is a region where space restructuring is given higher priority because it has very important effect on sovereignty, security and defense, economic, social, culture and/or environment, including the region labeled as world legacy. Pursuant to Article 26 in Law 26/2007 on Space Restructuring, one of substances that must be planned under RTRW is the determination of strategic region with the scopes of national, province and regency/city levels [7]. Based on Article 6 in Law 26/2007, space restructuring is performed by giving attention to several targets such as: 1. Physical condition of the regions throughout Unitary State of Indonesia Republic that are vulnerable to disaster; 2. Potentials of natural resource, human resource and man-made resource; economic condition, social, culture, politic, law, security and defense, life environment, and knowledge and technology as one unity; and 3. Geo-strategy, geo-politic and geo-economic issues.

3.2. Planning based on River Stream Region (DAS) Boundaries

Planning based on river stream region boundaries is essentially ensuring that the planning region can cover some regions or parts of regions in regency/city. River stream region is the unity of ecosystem with key substances including natural resources of land, water and vegetation, and human resource as the actor behind natural resource utilization. River stream region is a land region containing the unity of rivers and tributaries. This region is functional to retain, to store and to flow water from rainfall into the lake or the sea in natural way. Land boundary is a topographic separator, while sea boundary and water regions are still influenced by land activities.

River region is the unity of water resource management regions which covers one or more river stream regions and/or small islands with the width less than or similar to 2,000 km². River stream region boundaries are surely different from administrative region boundaries. Consequently, a river stream region can be located on more than one administrative region. River stream region may entails parts of some countries (in the case of Mekong river stream region), some regencies/cities (in the case of Brantas river stream region), or only parts in a certain regency. Criteria and Determination of River Region based on The Decree of Public Work Minister No.11A/PRT/M/22006 have established 133 river regions, comprising 5 regions across-countries,

27 regions across-provinces, 37 national strategies, 51 regions across regencies/cities, and 13 regions in one regency/city. The determination is adjusted to the discretion of each region. One of national strategic river region is Brantas river region (Figure 2 and 3). Brantas river region represents the second biggest river region in East Java and has occupied $\pm 25\%$ of East Java Province spread.



Figure 2: River Region Division in East Java Province



Figure 3: Brantas River Region Boundaries

Profile of Brantas river region is explained as follows. Its catchment area is 14,103 km². River length is ± 320 km that crosses 16 regencies/cities. Average rainfall has reached 2,000 mm/year with 85% falling during rain season. Surface water potential per year, in average, is 13.232 millions m³, and it has been utilized for 5-6 millions m³/year. Brantas river region development has been started in 1961 with the better planned, integrated, comprehensive, and sustainable approaches that are also environmental friendly, supported with integrated management system. It is empowered by tenet that River Region is a hydrologic unity (one river, one plan, and one integrated management).

One of river stream sub-regions along Brantas River has been examined for case study. This location remains at district level, respectively Bumiaji District in Batu City of East Java Province. Administratively, this location is extended to 13,036.79 km². Regional boundaries entailed into the

scope of river stream sub-region boundaries are 12,783.65 km². Bumiaji District, thus, has a distinctive marker, precisely the boundaries of river stream region / river stream sub-region that differ from administrative region boundaries of the District (Figure 4).

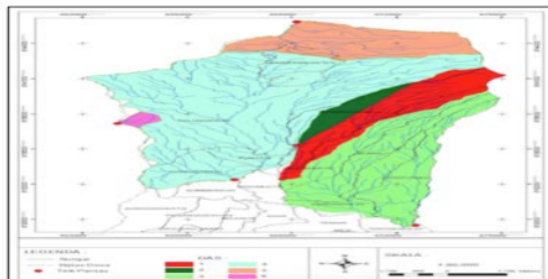


Figure 4: Boundaries of River Stream Region (DAS) in Certain District Region

3.3. Space Restructuring Prospect With River Stream Region (DAS) Approach

Regional development through space restructuring with river stream region approach has given several prospects: 1. To support governmental policies related to water resource conservation; 2. To improve interregional coordination; 3. To improve the coordination across-sectors in designing the program; 4. To implement space order planning for water resource conservation by giving it a strategic position in order to maintain and to improve water supply in current days or in the future; 5. To understand key indicators of space order success for water resource conservation. These indicators are understood by reviewing the conditions needed to exist at river stream region. These indicators are:

- (a) Surface Water Overflow. The bigger overflow, the more possible that river stream region does not have good absorption area.
- (b) Debit Ratio (Max Q and Min Q). The smaller ratio of Max Q to Min Q, the more successful the management of river stream region.
- (c) Dryness. The more extensive the dryness subjected to the region, the more unsuccessful the management of river stream region.
- (d) Underground Water Depth. Excessive deforestation and water absorption scarcity can reduce the front of underground water (becoming deeper).
- (e) Water Source Debit. The decrease and diminishing of water source debit may ruin water source ecosystem, especially in wetland ecosystem.
- (f) Erosion and Sedimentation Rates. The increase of erosion and sedimentation is related to dysfunctional land coverage.

3.4. The Challenge of Space Restructuring with River Stream Region (DAS) Approach

Regional development through space restructuring with river stream region approach cannot escape

from challenges. Among them are: 1. The available data are only administrative region boundaries (at scopes of province, regency, city, district, and village/sub-district); 2. Not all data are available in space format; 3. It is still necessary to conduct additional analysis to obtain condition based on river stream region boundaries; 4. It needs more specific expertise, among other is operating certain computer programs; 5. Interregional coordination is still weak; 6. The coordination between sectors is disturbed by sector-ego; 7. Program design still concentrates upon administrative region.

4. Conclusion

Planning based on river stream region boundaries must be deeply considered within space restructuring. Space order review with river stream region approach may help to improve program sustainability, especially for programs concerning with upstream and downstream regions. River stream region approach may enrich the development of space order concept by introducing multi-disciplinary approach that can be helpful and contributive to water resource sustainability. River Stream Region (DAS) cannot be managed only through sector-based approach, but the management must take account interdependence across sectors. River stream sub-region (Sub-DAS) from upstream to downstream is always becoming the focus of attention and also the base for the application of principle "one river one management". Improvement at upstream area will deliver benefits accepted at downstream area.

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