

# CHANGES OF SPATIAL PLANNING LAW AFTER NATURAL DISASTERS IN INDONESIA

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## ABSTRACT

Indonesia is surrounded by a volcanic belt, which causes major disasters such as the earthquake in Yogyakarta, the tsunami in Aceh, and the mudflows in Sidoarjo. A result of such disasters is that Indonesia has recently become more aware of the need to protect communities from their adverse impacts. Due to the Indonesian government's active efforts at disaster risk reduction, there is increasing concern about and recognition of the importance of disaster risk reduction.

In 2007, the Indonesian national government amended the Spatial Planning Law 24/1992 (SP 24/1992). Regarding disaster management, the government also issued a Disaster Management Law (DM 24/2007). Both new laws endorsed the inclusion of spatial planning as one of the directing tools for disaster risk management. One aspect of disaster risk management is the improvement of the Spatial Planning Law, which helps to reduce the risk of damage caused by natural disasters. Establishing spatial planning based upon disaster risk management principles hopefully can reduce losses associated with disasters.

This paper reviews the changes resulting from the Indonesian Spatial Planning Law regarding disaster risk management. This paper clarifies the content of Spatial Planning Law 26/2007 (SP 26/2007) and DM 24/2007 related to spatial planning in disaster risk management. Accordingly, this paper presents a descriptive analysis derived from reviewing the literature and documents. It reveals that: 1) decentralization and zoning regulations in SP 26/2007 and DM 24/2007 provide an opportunity to solve spatial planning problems after a disaster; 2) however, SP 26/2007 and DM 24/2007 lack a definition of spatial planning in disaster risk management. This circumstance leads to difficulties in implementing these laws in Indonesian municipalities.

**Key words:** Spatial Planning Law 26/2007, Disaster Management Law 24/2007, Natural Disasters, Spatial Planning after Disasters.

## 1. Introduction

Natural hazards can lead to important changes in the daily life of a nation. The spatial planning law should be improved in response to these changes. Spatial planning is an important factor that plays a major role in the prevention of natural hazards<sup>1)</sup>. "Indonesian regulation directives in the disaster risk management program are devised to: (1) support

post-disaster rehabilitation and reconstruction in various regions; and (2) mainstream disaster risk reduction into spatial planning”<sup>2)</sup>.

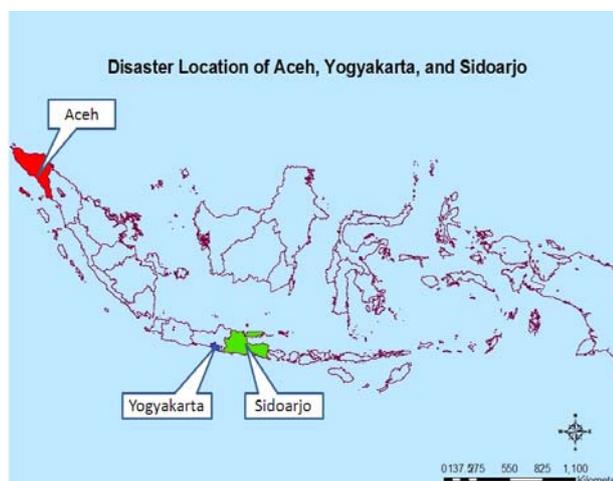
This research is about changes in spatial planning practices related to disaster risk management resulting from SP 26/2007 and DM 24/2007. Spatial planning is the process of allocating, forming, sizing, and harmonizing space (land) for multifunction uses<sup>3)</sup>. After such great disasters the spatial planning process has been performed at the local government level with less coordination<sup>4)</sup>. Meanwhile, the hierarchy of Indonesian spatial planning articulates land use policy from the national, regional and local levels. This means that the new law needs further instrumental regulation to ensure its implementation related to disaster mitigation effort and risk management.

This paper aims to clarify the accommodation of disaster risk management practices in the new SP 26/2007 and DM 24/2007. The tsunami in Aceh, the earthquake in Yogyakarta, and the mudflow in Sidoarjo are used to state the actual problems of disaster risk management and to clarify their accommodation. This paper comprises four sections. Section one is the introduction. Section two provides an overview of natural hazards and disasters in Indonesia related to spatial planning problems. Section three discusses amendments to SP 24/1992 and DM 24/2007 related to the spatial planning aspects of disaster risk management. Using descriptive analysis, this section also analyzes and clarifies the changes to the spatial planning law after the great natural disasters in Indonesia. Finally, Section four discusses the municipal zoning regulations in the context of regulating land use corresponding to disaster risk management.

## 2. Natural Hazards and Disasters in Indonesia

“Indonesia is ranked 12<sup>th</sup> among countries in relatively high mortality risks from multiple hazards. Indonesia is situated in one of the most active disaster hot spots, in which several types of disasters, such as earthquakes, tsunamis, volcanic eruptions, floods, landslides, droughts and forest fires frequently occur”<sup>5)</sup>. In the last five years, Indonesia has experienced at least three major disasters, depicted in **Figure-1** and **Table-1**.

After such disasters, the affected areas faced spatial planning problems



**Figure-1** The location of Aceh, Yogyakarta and Sidoarjo in Indonesia

**Table-1** Major disasters in Indonesia in the last five years <sup>6), 7)</sup>

Disaster Event	Date	Number Killed/House destroyed	Damage and losses (US \$)
Aceh Tsunami <sup>6)</sup>	Dec 2004	165,708 people killed/120.000 houses	4,450 million
Yogyakarta Earthquake, Central Java <sup>6)</sup>	May 2006	5,716 people killed/ 156,662 houses	3,314 million
Sidoarjo Mudflow, East Java <sup>7)</sup>	May 2006	13 people killed/ more than 15.000 houses soaked by mud	Unknown

during the process of rehabilitation and reconstruction, such as:

A. Spatial planning problem after the Aceh tsunami

On December 26<sup>th</sup>, 2004, the biggest earthquake and tsunami occurred to several coastal cities in the Aceh Province, causing sudden and massive destruction to natural, physical, financial, social, and human capital. Resulting spatial planning problems included<sup>8)</sup>:

1. The destruction of land ownership records, the erosion of boundaries, and the loss of land itself.
2. The urban linkages system disrupted because the transportation infrastructure was damaged or destroyed, road, bridges, and sea transportation facilities, such as ports.
3. A large amount of land was submerged or rendered unsafe for return as the tsunami.

B. Spatial planning problems after the Yogyakarta earthquake

Yogyakarta experienced a 5.9 Richter earthquake on May 27<sup>th</sup>, 2006. The disaster resulted in spatial planning problems, as follows<sup>6)</sup>:

1. The impacts of the disaster were highly concentrated in the high density, built-up area (average density was about 1,047 people per km<sup>2</sup>).
2. Yogyakarta is prone to both geo-hazards (landslides, floods, volcanic eruption and earthquakes) and ecological problems.

C. Spatial planning problems after the Sidoarjo mudflow disaster

On May 29<sup>th</sup>, 2006, mud and gas blew out and flowed at an oil exploration facility operated by PT Lapindo, in Sidoarjo Regency. The cause of the disaster is not clear yet, whether it was a natural disaster or a disaster related to human actions. Geologists, scientists, non-governmental organizations (NGOs) and victims blamed irresponsible drilling by PT Lapindo. But PT Lapindo blamed the earthquake in Yogyakarta, which happened on May 27<sup>th</sup>, 2006, as the trigger<sup>9)</sup>. The physical impact of this disaster has been extremely unusual regarding spatial planning issues, such as:

1. Mudflow disaster occurred in the urban area, causing the maximum loss of property and life. This condition is worsening due to the continuing mudflow; it is unclear when it will end, so the extent of the affected areas is not known yet<sup>9)</sup>.
2. The victims have had big problems related to proof of land ownership for obtaining compensation<sup>7)</sup>
3. The areas of disaster cannot be rehabilitated or reconstructed because they have been soaked in the mudflow<sup>7)</sup>.

Another problem resulting from the Aceh and Yogyakarta disasters has been the lack of building code and regulation awareness related to urban planning issues<sup>10)</sup>. Spatial planning provides various tools to prevent natural hazards due to certain spaces utilization. Therefore, spatial planning more or less influences vulnerability in cases of existing spatially-relevant natural hazards<sup>1)</sup>. The tsunami in Aceh, the earthquake in Yogyakarta, and the mudflow in Sidoarjo require a special spatial planning regulation to provide for an effective rehabilitation and reconstruction process related to the spatial planning problems mentioned above.

At the national level, the monitoring, archiving and dissemination of spatial data related to the rehabilitation and reconstruction process have been made available for those areas affected by hazards. However, when data reach the intended local area, the utilization and dissemination of that data is not optimal due to a lack of qualified management personnel

and the capacity limitations. These problems mean that the policy, legal or regulatory policies are not fully because of the results of the limitations on existing capacity<sup>4)</sup>. Therefore, implementations of spatial planning policies for disaster risk management were sometimes inconsistent and contributed to the high risk of natural disasters.

### 3. Amendment of Indonesian Spatial Planning and Disaster Management Laws

#### 3.1. Spatial Planning and Disaster Risk Management in Indonesia

After those major disasters, Indonesia adopted new regulations on spatial planning with SP 26/2007. Spatial planning refers to the methods used by the public sector to influence the distribution of people and activities in spaces of various scales. The classification is based on the administrative coverage of the planning (**Table-2**). Risk management is defined as policy adjustments that intensify efforts to lower the potential for loss from future extreme events<sup>1)</sup>. This definition shows that the decisions of stakeholders characterize risk management practices. When talking about disaster risk management, the stakeholders must always distinguish between the regional and local levels. **Table-2** describes the tasks of local governments regarding disaster risk management, based upon SP 26/2007. The Municipal Technical Spatial Plan in SP 26/2007 plays a crucial role in mitigating the damage of natural disasters because the plan is very detailed.

**Table-2** Contribution of SP 26/2007 to disaster risk management<sup>1)</sup>

Risk Management	Provincial Spatial Plan (RTRWP) 1:250,000	Municipal Spatial Plan		
		Municipal General Plan (RTRW) 1:100,000-50,000	Municipal Detail Spatial Plan (RDTRK) 1:25,000-5,000	Municipal Technical Spatial Plan (RTBL/RPP)
Prevention-oriented mitigation	Planning of vulnerable area to the restricted area to the development	Establishment of spatial patterns: conservation areas and cultivation areas	Mapping prone Areas	Local action plans for disaster risk reduction
Nonstructural Mitigation	Maintenance of protective features of natural environment that absorb or reduce hazard impact	<ul style="list-style-type: none"> <li>• Information management</li> <li>• Land use planning</li> <li>• Local codes</li> </ul>	<ul style="list-style-type: none"> <li>• Zoning regulation</li> <li>• Building permission, development control, etc</li> </ul>	<ul style="list-style-type: none"> <li>• Adapted land cultivation</li> <li>• Evacuation route</li> </ul>
Structural Mitigation	–	Secure the availability of space for protective infrastructure	Infrastructure planning regarding to disaster mitigation	Detail engineering design protective infrastructure

#### 3.2. Amendment of SP 24/1992 to SP 26/2007

SP 26/2007 provides a new convention for spatial planning, compared with the SP 24/1992 related to spatial planning problems after disasters (**Table-3**). Application of the new convention is an interesting issue, especially when associated with the implications of disaster risk reduction. The main issue presented by the new SP 26/2007 is the change in the role of the authority for controlling spatial planning from one of “centralized management” to “decentralized management.” In addition, the new SP 26/2007 gives more attention to environmental issues, disaster management and control of spatial planning law than did SP 24/1992. Municipal spatial planning is the most effective method for achieving a long term reduction of community vulnerability to multiple natural hazards<sup>12)</sup>.

**Table-3** Comparison of SP 24/1992 to SP 26/2007 related to spatial problems after disasters <sup>11), 13)</sup>

Comparison	Spatial planning law 24/1992	Spatial planning law 26/2007
Authority	Under centralized administrative system	Decentralization with promulgation of the law on decentralization 22/1999
Approval	President appoints a minister to coordinate the spatial planning	The administration of spatial planning is performed by a minister
Disaster issues	<ul style="list-style-type: none"> <li>• Spatial planning differentiated spatial plans by two main functions; conservatory areas and cultivation areas</li> <li>• Conservation areas have the main function for protecting environmentally sensitive areas, activities that are allowed in this area are very limited.</li> </ul>	<ul style="list-style-type: none"> <li>• Spatial planning differentiates spatial plans by two main functions; conservatory areas (<i>kawasan lindung</i>) and cultivation areas (<i>kawasan budidaya</i>)</li> <li>• Enhances safety standards, including strengthening of the regulatory and planning framework for disaster risk reduction</li> </ul>
Land ownership after disaster	Unstated	Unstated
Density of population	Unstated	<ul style="list-style-type: none"> <li>• The minimal standard of services in spatial planning. Such provision is to ensure the good quality of basic services of spatial planning for the Indonesian people.</li> <li>• The requirement of at least 30% of urban areas for open spaces.</li> <li>• Forest areas must be account be account for at least 30% of river stream areas.</li> </ul>
Control	<ul style="list-style-type: none"> <li>• Unclear zoning regulation</li> <li>• Enforcement incentives and disincentives for utilization of space are unclear</li> </ul>	<ul style="list-style-type: none"> <li>• Enhancing development control, including zoning regulation, planning permits, implementation of incentives and disincentives, and application of sanctions.</li> <li>• The incentives could be tax cuts, compensation, cross subsidies, planning permit deregulation and awards. The disincentives include higher taxes, the limitation of infrastructure compensation and penalties.</li> </ul>

The recent implementation of decentralization in Indonesia has significantly affected disaster management at all levels of government<sup>14)</sup>. In this era, districts/municipalities have more authority to manage their region; hence, they have more responsibility for coping with disasters. Decentralization laws and regulations in Indonesia that delegate administrative powers to local governments and give them an increasingly central role in government functions at the local level have progressively emphasized the need for a more effective advanced planning capacity among the actors and stakeholders in municipalities/district <sup>15)</sup>. In the case of the Municipal Detail Spatial Planning (RDTRK) Pleret sub-district of the Bantul district, Yogyakarta 2009-2018, mitigation efforts were performed by public consultation and in-depth interviews with community, private sector and relevant agencies. Their condition shows that the Bantul districts have the following advantages in disaster management: 1) they represent local perspectives in policy making, 2) they bridge and promote communication between higher and lower levels and also relevant agencies and 3) they assist and guide locally the implementation of disaster risk management.

The establishment of land ownership is important for minimizing potential disputes for the rehabilitation and reconstruction process<sup>8)</sup>. Unfortunately, SP 26/2007 excludes land ownerships issues from the spatial planning process (**Table-3**). In reality, to solve these land

problems after disasters, the Indonesian government carried out the Reconstruction of Aceh Land and Administration System (RALAS) for tsunami Aceh <sup>8)</sup> and issued Presidential Regulation (PP) 14/2007 for the mudflow disaster. However, PP 14/2007 was amended by PP 48/2008 to escalate the corresponding problems of land ownership<sup>7)</sup>.

### **3.3. Disaster Management Law 24/2007**

Indonesia issued DM 24/2007, which serves as a framework for regulating the role and responsibility of government and all concerned stakeholders, establishing national and local boards for disaster risk reduction and funding disaster risk reduction. DM 24/2007 has created three paradigm shifts in disaster management practices, as follows <sup>4)</sup>

1. From emergency response to risk management.
2. Protection for the people is government's responsibility and one of the basic rights.
3. From the responsibility of the government to the responsibility of the community.

DM 24/2007 aims to protect society from disaster risks by requiring the synchronization of the existing laws and regulations and establishing a planned, coordinated and comprehensive disaster management system that honors local culture, develops public and private partnerships, encourages solidarity and generosity, and creates peace within the society at the nation-state level. Although the spatial planning concept in DM 24/2007 is generally accepted, its translation into institutional and societal behavior is contentious. In addition, there is always some institutional reluctance and inertia to abide by the changes prescribed by the new law<sup>16)</sup>.

### **3.4. Linkages of SP 26/2007 and DM 24/2007**

DM 24/2007 and SP 26/2007 on Spatial Planning provide a new challenge for local governments in disaster risk reduction measures and spatial planning. SP 26/2007 has organized the importance of disaster prevention through the physical limitation of the areas vulnerable to disasters. It also includes disaster-prone areas as conservation areas. **Table-4** shows spatial planning for disaster risk management and the necessary improvements. DM 24/2007 provides detailed information and implementation spatial planning of SP 26/2007 both pre and post disaster. Directions on controlling the national and provincial space utilization in spatial plans, which contain directions for zoning regulations and directions for permits in SP 26/2007 (**Table-5**), can be used to improve systematic information sharing and capacity at the local level. In this circumstance the application of direction is the authority of local government.

## **4. Spatial planning Law after Great Natural Disasters in Indonesia**

### **4.1. Land use planning**

Land use planning is one of the key elements in disaster risk management and is one of the efforts listed in The Hyogo Framework for Action 2005–2015. <sup>3)</sup> Land use planning provides spatial order and the basis for infrastructure upgrading, including re-examination and revision of land allocation policy, strengthening physical planning capabilities, and use of both regulatory and economic incentives to achieve land use optimization, recognizing that land is finite and fragile. In this research, land use means land development regulations that are an integrated part of municipal spatial planning. Municipal land use planning is the

most effective method for achieving a long term reduction of community vulnerability to multiple natural hazards<sup>12)</sup>.

**Table-4** Spatial planning for disaster risk management in DM 24/2007 and SP 26/2007<sup>17), 11)</sup>

Issue	DM 24/2007	SP 26/2007	Associated spatial planning problems after disaster, these two law need :
Pre Disaster	Details implementation and enforcement of spatial plan	Provides some new ways to enhance development control, including zoning regulation and planning permits.	Zoning regulation need more information that zoning regulation is build also to prevent disaster.
Post Disaster	Details implementation of rehabilitation and reconstruction process	Requires a review of spatial plans more than once in five years related to a great disaster.	<ul style="list-style-type: none"> <li>• Integrated land use. Co-operative spatial planning among municipalities in the framework of disaster risks management as the scale of disaster has been extremely uncommon and out of boundaries.<sup>18)</sup> Improvement of recognition and registration of land ownership.<sup>8)</sup></li> </ul>

SP 26/2007 and DM 24/2007 recognize that land use planning is the most important effort for reducing both pre disaster and post disaster impacts. Due to limited time and resources after a disaster, many important decisions related to land use planning are made by local officials, and the responses of various stakeholders are collected subsequently, often through hasty paperwork.<sup>4)</sup> In all disaster mitigation measures and risk management,

**Table-5** Content of spatial planning based upon SP 26/2007<sup>11)</sup>

Hierarchy Spatial Plan	Content
National Spatial Plan (RTRWN) 1:1,000,000	Direction on controlling the space utilization of national regions, which contains indications of the direction for national regulations
Provincial Spatial Plan (RTRWP) 1:250,000	<ul style="list-style-type: none"> <li>• Direction on controlling the space utilization of provincial regions, which contains indications of the direction for provincial system</li> <li>• Provincial spatial structure plan consists of conservatory and cultivation areas that have provincial strategic value</li> </ul>
Municipal General Spatial Plan (RTRW) 1:100,000-50,000	<ul style="list-style-type: none"> <li>• Provision for controlling the spatial utilization of municipal/regency regions that contain zoning</li> <li>• Provision for and utilization of the plan for open green space</li> </ul>
Municipal Detail Spatial Plan (RDTRK) 1:25,000-5,000	<ul style="list-style-type: none"> <li>• Building code and zoning regulation</li> <li>• Environmental infrastructure</li> </ul>
Municipal Technical Spatial Plan (RTBL)	<ul style="list-style-type: none"> <li>• Direction control and implementation</li> <li>• Infrastructure to mitigate the effects of natural disasters</li> </ul>

there must be the same perception among all parties concerned at each government level.

**Table-5** describes the contents of disaster risk management based upon SP 26/2007. Land use planning in SP 26/2007 consists of building standards and codes, development regulations, incentive and disincentive for development, and land/property accusations concerned with purchasing properties in hazardous areas. Evacuation routes, evacuation sites and structure detail engineering designs (DED) in RTBL are important variables in saving citizen's lives after earthquakes, tsunamis, and volcano eruptions. RTBL can be used in coordinating community development activities to reduce the impact of disasters under the decentralized government approach.

New spatial plans to implement regulations under SP 26/2007 must be issued within three years since the promulgation of this law. **Table-5** and **Table-6** show that during the transition time, local governments have different points of view of disaster countermeasures, based on SP 26/2007. The decentralization approach gives local governments the opportunity to take different measures towards different hazards. **Table-6** shows different implementations of SP 26/2007 by local governments due to the different interpretation of the laws. For example, after mudflow disaster and Yogyakarta earthquake, they do not have an amended provincial spatial plan based upon SP 26/2007, but they already had a municipal spatial plan. Only the Aceh municipality re-evaluated its building codes after a major disaster. This means that the implementation of disaster risk management, based upon SP 26/2007 and DM 24/2007 in three case studies, might cause less collaboration between the governments. These conditions contradict the hierarchy of Indonesian spatial planning (**Table-5**). Disaster mitigation efforts and risk management must be designed and implemented in an integrated and coordinated way that is in order of the level of government with decentralization efforts.

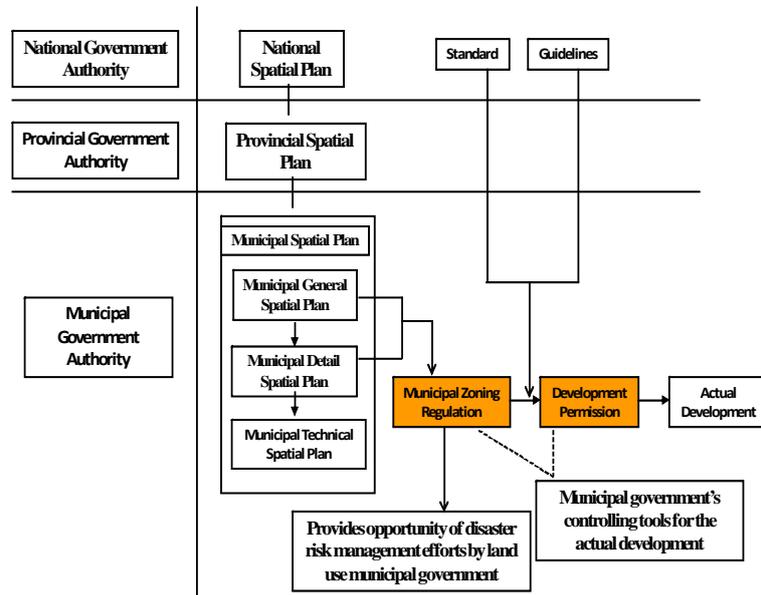
**Table-6** Content of spatial plans during the transition time of implementation of SP 26/2007<sup>11)</sup>

Disaster	Provincial Spatial Plan (RTRWP)	Municipal Spatial Plan		
		Municipal General Spatial Plan (RTRW)	Municipal Detail Spatial Plan (RDTRK)	Municipal Technical Spatial Plan (RTBL)
Aceh Tsunami	<ul style="list-style-type: none"> <li>Changes Provincial spatial structure</li> <li>Physical density zoning based upon damaged zone<sup>19)</sup></li> </ul>	<ul style="list-style-type: none"> <li>Establishment of local building codes</li> <li>Development plan based upon damage level</li> <li>Spatial zoning regulation<sup>19)</sup></li> </ul>	<ul style="list-style-type: none"> <li>Housing development plan based upon disaster mitigation.</li> <li>Determining type and intensity of disaster Disaster mitigation for each disaster.<sup>20)</sup></li> </ul>	<ul style="list-style-type: none"> <li>Housing development plan</li> <li>DED of structural mitigation action</li> <li>Evacuation route.<sup>21)</sup></li> </ul>
Yogyakarta Earthquake	–	–	<ul style="list-style-type: none"> <li>Zoning regulation</li> <li>Determining type and intensity of disaster for each sub-district</li> <li>Disaster mitigation for each disaster</li> <li>Capacity building for land use control<sup>22)</sup></li> </ul>	<ul style="list-style-type: none"> <li>Housing development plan</li> <li>DED of structural mitigation action</li> <li>Evacuation routes<sup>23)</sup></li> </ul>
Sidoarjo Mudflow	–	Improve spatial structure plan regarding disasters <sup>24)</sup>	–	–

#### 4.2. Zoning regulation as a tool for improving spatial planning after disasters

Zoning regulation in some countries is known by various terms, such as land development code, zoning code, zoning ordinance, zoning resolution, zoning by-law, urban code, etc. After a great disaster, the spatial plan should be prepared according to a specific procedure and supported by properly prepared and applied zoning regulations and local building codes. Zoning regulations should be adjusted with respect to different preferences and characteristics of the residents in each area, while the building codes should be applied selectively, particularly to public buildings, due to building costs unaffordable to the community at large. The most common approach to limiting the number of victims in prone area is to reduce building density due to the major disasters such as Yogyakarta earthquakes and Sidoarjo mudflows hit in density built up area.

The Ministry of Public Works has the mandate and capacity to manage the zoning regulation. This department provides technical guidance and assistance to local governments. As Indonesia decentralizes, the enforcement of zoning, standards and codes is more in the hands of local government. **Figure-2** shows the hierarchy of authorities concerned with spatial planning, which is made on the basis of a new article in SP 26/2007. Zoning regulation based upon SP 26/2007 is part of municipal detail spatial planning, as the figure shows. Zoning regulation in SP 26/2007 comprises two components: the zoning text and the zoning map. The text establishes zoning districts and sets development regulations governing land use and development. The map shows the locations of the zoning districts.



**Figure-2** Control spatial plan base upon SP 26/2007<sup>11)</sup>

As the figure shows, municipal governments now have the opportunity to keep the relationship between spatial planning and disaster management by regulating land capacity restraints, thresholds, and carrying capacity in eco/bio region development principles. Unfortunately, the new zoning regulation systems have just started, and their effectiveness in reducing disaster risks is an important research issue that needs to be clarified.

## 5. Conclusion

1. Land ownership, population density, lack of building codes and regulation awareness related to urban planning are major problems of improving spatial planning after a disaster. As shown **Table-3**, SP 26/2007 and DM 24/2006 give the opportunities to solve the spatial planning problems after disasters, excluding land ownership issues.
2. The integration of SP 26/2007 and DM 24/2007 emphasizes the municipal authority in disaster risk management. In this case, zoning regulation is promoted as the controlling tool for land use related to disaster risk reduction.
3. Different interpretations of the laws between the central and local governments occur due to the different interests that exist at each level. Municipalities have different types of spatial planning processes for coming disasters at each level. In the Aceh, zoning regulation consists of a municipal general plan. In Sidoarjo, no zoning regulation exists in the municipal general plan, as **Table-6** shows. Decentralization creates the opportunity to develop local disaster preparedness mechanisms based upon local characteristics, even though some of these mechanisms also still require effective coordination due to sector fragmentation, governmental administrative issues, and geographic conditions.

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