Urban Water Governance Through the Watershed Spatial Institutional Approach

I’anah¹, Hariadi Kartodihardjo², Januar Jarwadi Purwanto³and Kukuh Murtiaksono⁴

¹Graduate School for Natural Resource and Environmental Management, Bogor Agricultural Institute, Bogor, Indonesia
²Forest Management Department of the Faculty of Forestry, Bogor Agricultural Institute, Bogor, Indonesia
³Department of Civil and Environmental Engineering, Bogor Agricultural Institute, Bogor, Indonesia
⁴Department of Soil Science and Land Resources, Faculty of Agriculture, Bogor Agricultural Institute, Bogor, Indonesia
E-mail: ianah.prasetyo@gmail.com

Abstract. The Cisadane watershed in the upstream part of Bogor Regency is used as a source of raw water for PDAM Kota Bogor. Development in the Cisadane River Basin encourages the conversion of protected land and water absorption into built-up land. Government policies for resolving watershed area management have tended to be structurally resolved. The non-structural approach through the spatial institutional approach rarely makes attention. This study aims to analyze water management through an approach to watershed spatial planning and the pattern of coordination between inter-sectoral institutions related to the Regional Spatial Plan (RTRW) for sustainable water management. The study used a mixed method, first look problems about inconsistency with policy spatial planning and then descriptive qualitative approach through analyzing the role of the RTRW and coordinating inter-sectoral institutions. The findings of the study showed that the role of the RTRW had not been effective in ensuring the sustainability of water resources management. Local governments as leader power in determining policies have not been able to integrate inter-sectoral and inter-regional interests due to lack of coordination between related institutions. The use of water resources often does not see the production or water management system that is related to the RTRW, because of that the need for a coordination forum to bridge the interests of integrated water resources in spatial planning. Key Word: Cisadane Watershed, Spatial Planning Land Use, Urban Water

1. Introduction
The Cisadane watershed has an important role for Bogor and its surrounding residents because the Cisadane watershed is one of the water suppliers in the Bogor region. The Bogor region faces major water management challenges, especially in watersheds [1]. The challenge is in the form of increasing the needs and demands of water services in various sectors. This condition is caused by increased urbanization, industrialization, population growth, and competition for scarce natural resources [2]. Annual population growth in the Bogor area has an impact on increasing residential land and other economic activities that have resulted in changes in land use in the Cisadane watershed. Changes that
occur uncontrollably can damage the watershed conditions so that it influences the water balance components such as interception, evapotranspiration and surface flow and the amount of water availability that can be allocated to the industrial, irrigation and domestic sectors [3]. The upstream part of the Cisadane watershed area still has a fairly high density, especially in urban areas. The population in the Cisadane watershed based on the 2010 population census was 3.49 million people with a population density of 2,300 people/km², with the highest population distribution in the Central Cisadane watershed of 39.80% and 30% of CisadaneHulu watershed [4]. Based on the research there was a change in water storage capacity from 142.15 mm in 2009 to 137.47 mm in 2013 so that the water storage capacity decreased by 4.67 mm, which is equivalent to 2.0x106m3 / year for an area of 43663 ha [5].

The area of Cisadane watershed in Bogor Regency 107,608.42 ha (69.4%) of the total area of Das Cisadane. The Cisadane watershed in Bogor Regency is included in the upstream section. The characteristics of the watershed's natural resources are beneficially shared resources (Common Pool Resources / CPRs) which point to two characteristics, namely the nature of resources and the collective nature of their management which have non excludable and substract [6,7,8]. Public property resources such as rivers, beaches, forests and cattle grazing, everyone can benefit. Everyone can get the same access, then the resource belongs commonly exploited in a way excessive [9]. The characteristics of shared resources are at risk of being damaged because no one is responsible and their collective actions do not provide incentives to realize sustainability for the management of these resources [10]. On the contrary [11, 12] states that shared resources can be well maintained if there are collective actions and institutions that effectively regulate community interactions in the use of resources. The sustainability of development and management of natural resources is determined by the conditions of a balanced ecological, economic and social aspect [13]. Land conversion is a common problem in water resources. The problems of water resources include problems in quantity, quality, and institutions. Weak coordination between actors in the management of water resources within the watershed causes programs and activities not yet oriented towards achieving common goals. The work program is structured partially based on the interests of each actor and often overlaps so that watershed management is ineffective [14]. Overlapping interests occur because each actor strives for maximum profit, according to neoclassical economic theory.

Environmental degradation that occurs in the Cisadane watershed area is mostly related to human characteristics that utilize and manage the environment and also the relationship between people (social system). Such damage creates economic costs, decreases food security, environmental degradation, and loss of ecosystem services. Spatial planning is one of the nonstructural approaches to managing the sustainability of urban water resources. Spatial planning is an active effort by humans to change the pattern and structure of spatial use from one balance to a new, better balance. The element of spatial planning involves two things, namely the physical elements of space and non-physical (institutional) elements. Non-physical / institutional elements include aspects of the preparation of rules (rules) and aspects of organizing the division of roles (roles) in order to implement the rules of spatial planning. The essence of institutional elements is regulating human relations in spatial planning and regulating the way humans use or manage space and the resources within it. Thus, as long as humans are considered as the most decisive party in spatial dynamics, it is very important to direct humanity's viewpoints (value systems) about society, and space resources, and regulate human behavior towards space and its resources.

Two important aspects in spatial planning institutions are regulatory, legal and policy aspects and institutions that work together to achieve spatial planning goals. Spatial Planning as a form of positive intervention with the dimensions of space to overcome market failure, intervention is carried out by public institutions namely community institutions (local), government and global institutions [15]. Space management is very important especially in common goods. Characteristics of common goods or Common pool resources (CPRs) have competitive non-excludable properties such as watersheds (DAS) and protected areas [16]. The upstream watershed as a protected function is a Common Pool Resources (CPRs) where in space utilization should refer to the Regional Spatial Plan (RTRW).
Changes in uncontrolled land functions will have an impact on the criticality of water resources, increase in flood discharge, and vice versa, decrease in mainstay discharge. The management of water resources is also faced with the conditions of difficulty in providing land for the construction of water resources infrastructure, such as dam construction, retarding basin, and canal flooding. The government is often faced with prolonged social conflicts in terms of providing this land. The role of spatial planning in the management of water resources is to ensure the availability of water, both quality and quantity, for the present and the future through the management of conservation areas and control of water quality. Integration of management of water resources with spatial planning occurs obstacles related to different conflicts of interest, priorities, policies, and planning instruments that need to be addressed by decision makers and government institutions.

The main problems related to land and water that occur in the Cisadane watershed are related to high soil erosion, decreasing surface flow discharge during the dry season [17]. The impact of land changes is an increase in surface flow due to land changes that occur in the DAS [18]. The safe limit of C value is 0.5, in the Cisadane watershed the run off (C) coefficient value of 0.72 is much greater than the safe C value limit of 0.5 [17]. This shows that the use of space in the Cisadane Hulu watershed has disrupted the condition of the water system. Therefore, it is necessary to study the use of the watershed area (DAS), because the negative effects caused do not recognize administrative boundaries. The management of the upstream watershed is very important because of this area the process of hydrological processes begins within the watershed.

The management of the watershed is more concerned with the social and economic activities of the community. Watershed management as a sustainability of water resources and hydrological systems. Watershed management will not achieve good performance if the issue of watershed spatial institutions is not in accordance with the specified requirements. Watershed Conservation through a spatial approach will be achieved if the institutional equipment is able to direct individual or community behavior so that there is no inconsistency in the use of protected areas in watershed. Utilization of land in protected areas does not cause negative impacts on the environment such as critical land, landslides and loss of water catchment areas. Problems with inconsistencies and violations of the use of protected areas in the watershed because they are largely determined by existing rules both formal and non-formal rules. Play rules are a form of institution that determines interdependence between individuals or groups of people involved [19]. Institutions govern what is allowed or not allowed by the community or may be done in a situation [20].

Based on the above, it is necessary to have effective communication and care between institutions in the management of integrated and sustainable water sources. The role and coordination of water resources management institutions with spatial planning institutions is very important for the realization of control of water resources contained in the spatial plan. Studies related to the effectiveness of water resources institutions with spatial institutions are needed. The research aims to analyze the role and pattern of coordination of cross-sectoral institutions related to water resources planning and management in the Regional Spatial Plan (RTRW). River-basin approach’ and refers explicitly to interrelations between water management and land use [21]. Overall, the institutional rescue process [24] has an effect on spatial planning and water management.

2. Research purposes
The aim of the study was to identify barriers to managing water resources through a regional spatial plan approach. Through research it is expected that the government will enter into the shortcomings that arise and what needs to be done in the management of water resources in the context of the RTRW.

3. Methods
The approach method used in this study uses a mixed approach. Mixed methods are carried out by combining or extending from quantitative methods at an early stage with findings from qualitative descriptive methods at a later stage [22]. The types of data needed in this study are 2016 land cover
spatial data, Bogor Regency space use / utilization (RTRW) map data, Cisadane watershed water needs data, Statistical data from BPS secondary data. Qualitative methods through the approach of this study are based on facts that took place in the field which were then carried out a study of how water governance effectiveness of government institutions in integrating patterns of water resources management in regional spatial plans in West Java Province. The data collection method used is the method of collecting primary data and secondary data. The method of collecting primary data is done by field observations, questionnaires, interviews. Field observations are useful to obtain an overview of the coordination of water resources and spatial planning institutions related to the integration of patterns of water resources management and to see the authority in relation to the integration.

Interviews were conducted to determine the perceptions of respondents regarding the integration of water resources management in the RTRW. The respondents included BBWS, BPDAS, Bogor Regency Bappeda, PSDA, BPN and Bogor Regency Spatial Planning Office, environmental and spatial experts. Secondary data collection methods are carried out by document review and literature review of books, laws, journals, and internet articles. The analyzes carried out in this study are: (1) RTRW Analysis, Water Catchment Area and land cover (2) Analysis of policies related to identification of spatial planning institutions and identification of water resources management institutions by the Central Government and Regional Governments in Bogor Regency. In this analysis a study of the role of government institutions in cross-sectoral coordination related to water resources management through an approach to regional spatial planning.

4. Results and Discussion

4.1. Space Pattern of the Cisadane Watershed In the RTRW of Bogor Regency Perda no. 11 of 2016

The area of Cisadane Watershed in Bogor Regency is 107,608.14 ha (69%). Bogor RTRWK is stipulated by Regional Regulation number 11 of 2016 concerning Bogor RTRWK for 2016-2036. that in the 2016-2036 RTRW the protected area was allocated an area of 63,889.53 ha (59.37%) consisting of conservation forest area 20,436.14 ha (31.99%), protected forest area 3,117.65 ha (4.88%) and situ 169.16 ha (0.26%). The use of space in protected areas in the upper Cisadane watershed is conceptually prioritized as a protected area even though there are some cultivation areas. Efforts made in protected area management are management and control of existing protected areas. Activities in watershed management have often been limited by political/administrative boundaries (State, Province, District), one of which is the use of space in the watershed area. One reason why the handling of problems in a watershed is less successful due to the separation of policies from each region. Uncontrolled changes in land use and spatial development, the causes of which are not cities / districts do not have spatial concepts, but because the implications of the Spatial Plan are less rapid with the spatial changes on the ground [23]. There are four factors that influence the performance of natural resource management, namely natural capital, human capital, man-made resources and formal and informal community institutions [24].

Table 1 Bogor Regency Protected Area

| Function of Protected Area | APL  | HL     | HP     | HPT    | KSA/KPA | TA     | Total (Ha) |
|----------------------------|------|--------|--------|--------|---------|--------|------------|
| Protected Forest           |      | 3 117.65 |       |        |         |        | 3 117.65   |
| Conservation Area          |      |         |        |        |         |        | 20,436.16  |
| Water Catchment Area       | 4,484.84 | 2,241.40 | 810.76 |        |        |        | 7,537.00   |
| River Basin Area           | 4,052.52 | 168.68  | 6.10   |        | 246.51  |        | 4,473.81   |
| Reservoir Area             | 711.09 | 1.72   |        |        | 5.84    |        | 718.65     |
| Total (Ha)                 | 9,248.45 | 3,117.65 | 2,643.70 | 816.86 | 20,436.16 | 252.35 | 36,283.26 |

Sources: Bappeda 2016
Information: APL=Other Usage Areas; HL=Protected Forest; HP=Forest Production; HPT=Limited Production Forest; KSA/KPA= Nature conservation area; TA= Body of Water
Map Plans for protected areas that play a role in maintaining water availability include protected forest areas, conservation areas, water catchment areas, river border areas and reservoir areas. Based on the table above, the protected area that functions as a water provider in the Cisadane watershed in Bogor Regency with an area of 36,287.23 ha consisting of 20 conservation forest areas 3,176.16 ha (56.32%), protected forest area 3,117.65 ha (8.59%), water catchment area 7,540.97 ha (20.79%), river border area 4,473.81 ha (12.33%) and reservoir area 718.65 ha (1.98%). Protected forest areas and conservation forest areas as areas that function as regulators of water management cover 23,553.81 ha (64.91%) of protected areas to regulate water management. This protected area functions in the functions of KSA / KPA 20,436.16 ha, function of protected forest 3,117.65 ha, function of production forest 2,643.70 ha, function of limited production forest 816.86 ha and area of Other Use Area (APL) 9,248.45 ha. The area of protected area in the APL function is 9,248.45 ha (25.49%) which is a non-forest protected area that must be protected as a water catchment area and regulate water management. Other Use Areas are land owned by communities that have protected area functions. The lack of regulation of the use of private space in the function of protection and the ineffectiveness of incentives for owned land that contributes as a provider of water is what drives the community to convert the land. Neoclassical economic theory assumes that each individual thinks rationally in acting and being individualistic in order to get the maximum profit. The condition of protected area cover in Cisadane watershed in Bogor Regency can be seen in the table below.

Based on the table of protected functions of Bogor Regency with land cover 2016 shows that the conditions of protected areas that function as regulators of water management that have forest cover covering 19,227.08 ha (17.86%) of the Cisadane watershed area in Bogor Regency 107,608.42 ha. The conservation area for forest cover was 16,939.53 ha (82.14%) and protected forest with forest cover covering 1,122.95 ha (36.02%), water catchment area 703.29 ha (9.3%), river border area 460.79 ha (10.33%) and reservoir area only 0.52 ha. One component in the watershed ecosystem that is important in maintaining water absorption is vegetation. Vegetable land as a component of erosion and drought buffer [25]. The diversity of vegetation in both watershed trees and floor cover plants (lower
crop community / LCC can be used as a water absorber because vegetation cover affects the ability of the soil to hold water [26].

**Table 2 Coverage of Water Protected Areas in 2016**

| Function of Protected | Forest       | Built Land  | Plantation | Dryland Agriculture | Rice field | Open Field | Body of water | Total (Ha) |
|-----------------------|--------------|-------------|------------|---------------------|------------|------------|---------------|------------|
| Protected Forest Area | 1 122.95     | 1.64        | 1 982.82   | 1.59                | 8.65       | 3 117.65   |               |            |
| Conservation Area     | 16 939.53    | 34.25       | 282.34     | 3 113.52            | 1.54       | 64.94      | 20 436.12    |            |
| Water Catchment Area  | 703.29       | 414.16      | 5 940.28   | 473.07              | 2.2        | 4.01       | 7 537.00     |            |
| River Basin Area      | 460.79       | 236.40      | 170.00     | 23 56.65            | 1 002.52   | 0.12       | 247.32       | 4 473.81   |
| Reservoir Area        | 0.52         | 112.35      | 55.02      | 502.10              | 34.09      | 2.21       | 12.36        | 718.65     |
| **Total (Ha)**        | **19 227.08**| **798.80**  | **507.36** | **13 895.37**       | **1512.81**| **69.47**  | **272.34**   | **36283.23**|

Source: Analysis

Integration of national development plans into the RTRW has been carried out, but integration in the field of water resources has not been fully implemented. Integration of water resources with the RTRW focuses more on the infrastructure network system Water resources in supporting agricultural raw water, industrial raw water needs, drinking water needs, and flood control systems. Management of water resources consists of conservation of water resources, utilization of water resources, and control of water damage, integration should be carried out by translating these three components into spatial structures and spatial patterns on the RTRW. The integration of the water resources management plan into the RTRW must be reflected in the objectives, policies and strategies, both at the national, provincial and district / city levels.

4.2. **Characteristics of the Cisadane watershed**

Watershed as a natural resource that has the characteristics of CPRs because it has competition and exclusivity. Competition in the watershed is fulfilled because the availability of land as a limited catchment area and each land conversion will affect the watershed's ability to prevent flooding, characterized by high transaction cost and High exclusion. Cisadaneas a complex institutional system [27]. Based on property right, the Cisadane watershed area is divided into two groups, namely state property and private property. The areas that belong to the state in a watershed are protected forests, conservation forests, production forests, limited production forests, rivers and borders of rivers, springs, lakes, reservoirs and embungs, Land Use Rights (HGU) owned by individuals (certificates) and customary land (land that has not been certified from generation to generation). For this reason, an agreement is needed on regulations on resource access, allocation and control [28]. Watershed management involves many parties, both government and non-government. The Ministry of Forestry (national park) is responsible for conservation areas, Perhutani Corporation is responsible for limited production forests and production forests and BPDAS CiturumCiliwung rehabilitates land both in forest and non-forest areas. The Ministry of Public Works is responsible for water resources, while the regional government has the responsibility of preparing the RTRW which refers to the provisions of the Ministry of Forestry and the Ministry of Public Works to safeguard the conservation area.

The regional government only receives input regarding the boundaries of the forest area and river area and abstraction, but the role of supervision and control of the regional government feels that it is not their authority. Problems that occur in the determination of non-forest protected areas such as river boundaries to date the border boundaries of the Cisadane watershed have not been established, so that the utilization that leads to destruction continues to occur, such as buildings that stand on the border, garbage disposal and waste which causes river siltation and transfer of functions Owned land cannot be controlled. The results of interviews and observations in the field that damage in protected areas
and rehabilitation efforts carried out by the Ministry of Forestry is slow because it is related that critical land is often found on land owned and HGU land and the problem of land conflicts in forest areas. In river management, local governments hand over to the central government because the Cisadane watershed is on a national scale, causing handling not optimal because of throwing responsibility at each other. The most important thing is that no institution is responsible for coordinating the implementation of the spatial plan policy. Understanding of hydrology and ecological relations in the watershed ecosystem is very necessary. The choices that must be made in watershed management must pay attention to the impact that will be received downstream [29,30] different spatial plans produce different total hydrological output [31].

Water resources currently available in Purwabakti Village are widely used by around 7,623 people for agriculture and daily domestic needs. Until now there are no other utilization model data available by the community. PT. Cevron Geothermal utilizes water resources in the Halimun-Salak corridor area, where the company's exploration and exploitation areas are under expansion in TNGHS (Taman Nasional Gunung Halimun Salak). Although indirectly utilizing water, the geothermal company continues to use water vapor as the main ingredient in the company's production. Cisadane River is also the source of the Tangerang City PDAM and Soekarno Hatta airport. He revealed the biggest customer in Cisadane water use, PT Angkasa Pura II. Cisadane is used at Soetta Airport and becomes a consumer of other passengers. Based on the information obtained, the annual data on water use at Soetta Airport increases. In 2017 alone we need 11,535 cubic meters of water, and by 2018 it will certainly increase significantly because of the increasing number of passengers.

Watershed management will not achieve good performance if the issue of watershed spatial institutions is not in accordance with the specified requirements. Watershed Conservation through a spatial approach will be achieved if the institutional equipment is able to direct individual or community behavior so that there is no inconsistency in the use of protected areas in watershed. The use of land in protected areas does not cause negative impacts on the environment such as critical land, landslides and loss of water catchment areas. Issues of inconsistency and violations of the use of protected areas in the watershed because it is very much determined by existing rules both formal and non-formal rules. Play rules are a form of institution that determines interdependence between individuals or groups of people involved [22]. Institutions govern what is allowed or not allowed by the community or may be done in a situation [23].

4.3. Identification of Institutions of Regional Spatial Planning in Bogor Regency
UU No 26/2007 concerning Spatial Planning, Bogor Regency has compiled Perda No 11/2016 concerning the 2016-2036 Bogor Regency Spatial Planning. Increased coordination of national and regional spatial planning through the National Spatial Planning Coordinating Board (BKPRN) and the Regional Spatial Planning Coordinating Board (BKPRD) play an important role. In addition, increasing coordination of Spatial Planning between the Directorate General of Spatial Planning and the Provincial and Regency / City Spatial Planning Offices. The provisions of the spatial planning institutional arrangement in the Regency are BKPRD with the person in charge directly by the Regent of Bogor Regency, the Regional Planning Agency and the Spatial Planning Office of Bogor Regency. In UU No 26/2007, the emphasis is on space allocation and coordination between institutions. Community participation in the preparation and control of space, but the community does not have a role in the final decision and the potential to change decisions.

The RTRW as an institution that regulates spatial arrangements in order to realize integration in the use of natural resources and artificial resources by paying attention to human resources, and materializing protection of space functions and preventing negative impacts on the environment due to the use of space [32]. The Cisadane watershed protected area with forest cover is only 17.1% far from the criteria for forest allocation requirements of 30% of the watershed area. In the Spatial Planning UU No. 26/2007, watershed areas should have at least 30% forest land cover, however in the Cisadane watershed area forest cover area continues to be degraded to date only 17.1%. The impact will directly
increase erosion which leads to higher landslide events, River regime coefficient (KRS) is getting worse, where the high discharge in the rainy season and very minimum discharge during the dry season is due to the reduced vegetation cover in the watershed, especially in the area Upstream watershed. The inconsistency of land use in protected areas against the RTRW is feared to reduce the physical capacity of the land and threaten the sustainability of resources [33]. The use of natural resources in protected areas and the perception of watersheds as open access public goods are the main causes of the decline in the function of the CisadaneHulu sub-watershed.

Various activities in the upper Cisadane watershed for settlements, tourism, mining and industry, the different interests and influences between actors can be a source of conflict in the management of a region, because each actor tries to use the power, he has to gain his interests [34]. Therefore a water management model is needed with an integrated spatial institutional approach and a holistic (holistic) approach to an ecosystem, the basic concept of the watershed area (DA) is needed. Government policy in watershed management is not effective because the behavior of policy actors is still colored by the sectoral paradigm without regard to synergies between sectors to obtain greater returns [35]. The structural approach that has been carried out as a necessary condition for the ministry has not yet been able to solve the Cisadane watershed problem because floods, landslides and droughts still occur every year and the impact tends to be greater [36]. This shows that the structural approach is not enough, so it is necessary to increase activities that use a non-structural approach as sufficient conditions.

The failure of protected area management that has an impact on damaging the watershed does not mean that there is no formal policy that governs, failure can occur as a result of the institution being implemented is not in accordance with the situation. The development of appropriate forest management institutions will deliver good performance and can be designed through appropriate incentive development [37,38]. Evidence in the field is that there is no incentive for owners of protected areas in the Cisadane River Basin to manage forested land in a sustainable manner. The policy that clearly regulates the provision of compensation / compensation for cultivation areas / land owned which is converted into a protected area does not exist. This causes landowners to feel disadvantaged due to spatial arrangements. Losses due to spatial planning should be given compensation. The procedure for determining, form and calculating the amount of compensation needs to be stated in government policy in the form of legislation.

In terms of the implementation of spatial planning, there are still serious obstacles that are the cause of the problems mentioned above. Unstable layout causes land use often not in accordance with the spatial plan. The inconsistency occurs at each stage of organizing spatial planning from planning to control of space utilization. At the spatial planning stage, the product of the spatial plan produced is still not a reference by various parties in the implementation of development [39]. This is partly due to the fact that the data and information used are not accurate, not including analysis of future resource use, spatial plans only to fulfill government obligations (Laws and Regulations), or often considered as the product of only one agency and spatial planning describe in detail the activities that must be carried out. Therefore, at the stage of spatial use, there is often no match between land use and its designation in an area's spatial plan.

One of the main causes is changes in land use carried out by humans to meet their living and living needs [40]. At the stage of controlling the use of space, the granting of permits that are not in accordance with the spatial plan by the local government, is good for reasons. The problem continues over time with different intensities. No problem is the problem is the cause of increasingly severe environmental degradation or the emergence of problems that chain in various other fields. Such problems occur in the Cisadane watershed, so the government through the Ministry of Forestry improved the handling status of the Priority II River Basin in 1999 to Priority Watershed in 2009 (BP Citarum-Ciliwung Watershed 2009). The main problems related to land and water that occur in the Cisadane watershed include erosion and sedimentation, surface hydrology, and land use.
4.4. Linkages in the Pattern of Water Resources Management (SDA) with the RTRW

The water resources management plan should be integrated into the RTRW and in objectives, policies and strategies, both at the national, provincial and district / city levels. It should be that in determining the program must include the location, amount, source of funds, implementing agency, and target time for implementation. On the policy order of integrating the PSDA Pattern into the Provincial RTRW and the Regency / City RTRW it is very necessary to ensure the availability of land for the construction of water resources infrastructure. The pattern of PSDA must be one element in the preparation and improvement of the RTRW, and conversely the development of water resources must be based on the RTRW that has been prepared.

UU No. 26/2007 concerning Spatial Planning that spatial planning must pay attention to the physical condition of the area and the potential of various resources (including water resources). The spatial plan includes a network system of water resources infrastructure, protected areas, and cultivation areas. Regional spatial policies affect water resources management. Therefore, the RTRW is expected to be a guideline to realize integration, linkages and balance between sectors (including natural resource management). Coordination of spatial policies with policies on water resources is needed for the sustainability of water resources. Inter-ministerial coordination, regional level (provincial and district / city) coordination, watershed level, local or regional level. Alignment and synchronization between the spatial planning policy with Water Resources (SDA) is crucial to do, both at the central and regional levels to guarantee sustainable carrying capacity of natural resources. Spatial planning as a framework for regulating land use has an important function in integrating water and landscape management more closely [40]. Basic use of PP No. 15 of 2010 concerning the implementation of spatial planning because in PP No. 37 of 2012 article 2 management of watershed is carried out in accordance with spatial plans and patterns of management of water resources in accordance with the provisions of legislation in the field of spatial planning and water resources.

The Natural Resource management plan that has been established is the basis for the preparation of programs and planned activities in the water resources sector, and as input in the preparation, review and / or improvement of the spatial plan of the region concerned. RTRW besides being a planning instrument, it is also a development control instrument. Violations of spatial planning will be subject to sanctions for every person / party who violates them. Management of water resources requires integration through coordination because water management covers cross-sectoral and cross-regional areas that require integration through coordination by integrating the interests of various sectors, regions, and stakeholders in the field of water resources. Coordination at the policy level between water resources management institutions and spatial planning institutions is needed for synchronization. The preparation of the district spatial plan must refer to the pattern of water resources management so that integration occurs with the regional development plan. The results of interviews with stakeholders stated that the problems of coordination of water resources and spatial planning institutions did not work well because their respective fields were still oriented to their respective main tasks and functions.

The link between the Regional Spatial Plan and the Management Pattern of the River Region Water Resources must be reflected in the objectives, policies and strategies, both at the national, provincial and district / city levels. Related to this matter, it is necessary to pay attention to the determination of the program that contains the location, amount, source of funds, implementing agency, and target time for implementation. Water resource planning and flood management in watershed management for sustainable development must integrate models of changes in land use distribution and hydrological distribution [41]. Case studies in the European Union, for example, have introduced principles of integrated watershed management that combine spatial suitability with ecosystems and social systems and integration of cross-sector water management at various management scales [42]. The Central Government should have a dominant role in the formulation of watershed management plans. The problem of coordination can be overcome through the mechanism of interaction of ideas and incentives can encourage effective institutional interaction, how each actor is able to coordinate in one watershed problem solving outcomes through the roles and main tasks of each agency involved in
watershed management. Intensive coordination needs to be carried out at all stages of the activity, from the planning, implementation to evaluation stages.

4.5. Integration of Patterns of Water Resources Management with RTRW

Water Resources Management consists of conservation of water resources, utilization of water resources, and control of water damage, these three components should be integrated in space and spatial patterns on the RTRW. Substantially, enter Pattern. Pattern / Plan for PSDA Determination of the size / size of the depiction of water resources infrastructure needs to be adjusted to the provisions in the preparation of the RTRW. Example Inputs of the PSDA Pattern into the RTRW if it is not possible to be included in the Map, a minimum is in the text or narrative. The integration of the water resources management plan into the RTRW must be reflected in the objectives, policies and strategies, both at national, provincial and district / city levels. The main topics of integration are also need to consider existing hierarchies both within the RTRW and in natural resource management. The RTRW hierarchy is arranged according to the level of government administration, namely in the form of a National RTRW, Provincial RTRW, and Regency / City RTRW. Whereas in the management of natural resources, the PSDA pattern is compiled based on the River Region (WS), the cross-country territory, cross-province WS, national strategic WS, cross-regency / city WS, and one district / city WS.

Figure 2 Problems with Coordination Between Regional Spatial Planning and Watershed Management

District, provincial and national watershed managers are still running sectoral not yet coordinating, integrating, synergizing in the watershed and spatial plan management plan. Weak coordination between institutions because each institution has different tasks and functions for each activity (orientation to output in the form of absorption of the budget has not led to the outcome). RTRW as a spatial guide for all agencies, the inaccuracy of spatial planning can occur when it is compiled. The commitment of the local government greatly influences the management of protected areas. The commitment starts from the establishment of protected areas according to existing regulations, including the planning of protected areas in the spatial planning document, the location permits given refer to the designation plan so that efforts to control the utilization of the running space.

Leadership and political will are the determinants of the success of this activity in the field so that strong leadership is needed from the regent, the relevant agency head, BPDAS, Perhutani to jointly encourage implementation in a comprehensive manner and understand each other's responsibilities by prioritizing functionalities over their authority. There is a long-term sustainability policy that is not affected by personnel changes in stakeholder institutions (maintaining no time in consistency). Public awareness and control regarding sustainable and environmentally sound control of land use, the use of chemicals in agricultural cultivation according to the rules and economically profitable need to get real support. It is necessary to establish a Cisadane Watershed Control Commission consisting of all
stakeholder representatives whose function is to formulate integrated Cisadane watershed management.

In the era of regional autonomy, the district government should act as a leader to coordinate all institutions in the area together to develop a spatial structure in a watershed. The provincial Bappeda has an important role in encouraging the active role of district or city governments in one watershed to develop spatial planning. As a reference, there are two central institutions in the area that can be used as resource persons, namely the Center for Watershed Management (BPDAS) and the Center for Management of Water Resources (BPSDA). Development control in accordance with the Spatial Plan and Drainage Master Plan. This is usually in the form of conservation in protected forest areas, beaches and swamps that have a function to reduce the impact of flooding. It also stipulates that each new housing must consider changes in surface runoff to a minimum and have adequate drainage infrastructure. Tarakhir, Green Open Space and Blue Room (Water Body) must also be maintained and designed to be more effective as a water reservoir (retention). Integration of the Pattern of Management of Water Resources into the Provincial or District / City RTRW is expected to be able to guarantee the implementation of water resources management going forward.

4.6. Water Resources Governance

The development and management of water resources infrastructure is generally directed towards achieving targets (1) Increased conditions and functions of reservoirs, situ and rivers as conservation facilities and infrastructure, raw water providers, and flood controllers (2) Increased productivity of water resources through increasing the efficiency and effectiveness of water utilization (3) Increasing partnerships and the role of the community in managing water resources (4) Increasing the application of economic incentives and disincentives in wastewater / waste management policies for both industrial and domestic waste. There is no synergy in handling the shift in land use, especially in forest protected areas, as well as inadequate reference to the management of areas that have been designated as non-forest protected areas, for example the reference in the utilization of plantation land that has been exhausted.

Improvements to water governance in addition to structural approaches also through a non-structural approach through the spatial institutional approach as a structure to be able to influence culture so that policies are able to build a positive culture. How the structure builds incentives, approaches the culture by looking at the norms and values that exist in the area, the social process as a dialogue of power holders. Innovative communication methods to bridge the gap between sectoral interests, related attitudes, not only on the distribution of power between sectors, but also the way space has been evaluated, interpreted and ultimately directed in a sustainable manner to establish regulatory changes between water management, spatial planning and environmental protection in institutional framework. Institutional change is largely a gradual process of changing interactions that results in new policy practices with the aim of promoting and institutionalizing new policy concepts that will lead to re-articulation of policy arrangements [43]. Policy makers need to include watershed management as part of development and land use planning, in order to build urban resilience to hazards related to water and the effects of climate change 42.

5. Conclusion

Urban water management is inseparable from the importance of the position of the watershed as a regional planning unit with logical consequences to maintain the sustainable use of forest, land and water resources. Inappropriate spatial planning can lead to degradation of watersheds resulting in adverse impacts especially on the sustainability of the water system. To manage resources that cross regencies / cities not only through formal and physical legal approaches but also socio-economic and cultural approaches that are realized through a long process of interaction and learning. The central and regional governments make policies regarding the management of water resources should be included in the regional spatial plan so that there is agreement in the preparation of patterns of water resources management in spatial plans. Coordination between central and provincial government
organizations involving all relevant government organizations in planning and implementing policy making is needed to achieve this. A coordination forum involving the two related institutions is needed to facilitate the formulation of policies that can produce guidelines for the integration of patterns of water resources management in regional spatial plans.

Based on the characteristics of watershed resources, land use arrangements need to be made, the most important being tree cover. The need for restructuring property rights on lands located in protected areas. The importance of woody tree cover as a watershed protection is a common pool of resources so that the control arrangements are in the local government. Land use arrangements that ensure the permanent existence of woody vegetation cover to limit community behavior, especially the transfer of ownership rights. Incentives to land owners such as product choices, technology, input investment are rights for exclusive owners of land by guaranteeing permanent woody plants. Based on Law No. 5 of 1960 concerning UUPA that land rights or anything that is on someone, groups of people or legal entities are not justified if the land will be used or not will be used solely for their own interests especially if it causes harm to the community.

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