An Analysis of Bodri Watershed Governance System

Husna Fauzia ^{1,2*}, Rukuh Setiadi ³, and Satya Budi Nugraha ⁴

¹ Master Student of Urban and Regional Planning, Faculty of Engineering, Diponegoro University, Semarang - Indonesia

² Office of Public Works Water Resources and Spatial Planning, Central Java Province, Semarang - Indonesia

³ Department of Urban and Regional Planning, Faculty of Engineering, Diponegoro University, Semarang – Indonesia

⁴ Department of Geography, Faculty of Social Sciences, Universitas Negeri Semarang, Indonesia

Abstract. Watershed management needs collaboration and program integration from all stakeholders including government and non-government institutions, as well as communities. Despite the existent of a number of regulatory frameworks, there are various problems in watershed management that need to be systematically diagnosed for future improvement. This paper focuses on Bodri Watershed, which stretches through three regencies (e.g. Temanggung, Semarang and Kendal Regencies) and has a vital role not only in the ecological but also socio-economic life of the surrounding communities. The paper aims to evaluate the current conditions of the watershed through governance lens. This paper employs Governance System Analysis (GSA) approach and mainly uses qualitative method for data collection. The paper finds that there is lack of coordination, integration, synergy and synchronization in the application of knowledge, connectivity and capacity for participation of related stakeholders to the management of the Bodri Watershed. This situation explains environmental problems and ecosystem damages in the Bodri Watershed area. These problems include massive land conversion, erosion, landslides, sedimentation, and flooding and drought in the rainy and dry seasons respectively.

Keywords: watershed management; Bodri Watershed; Governance System Analysis (GSA).

1 Introduction

Based on Presidential Regulation No. 12/ 2012 concerning Determination of River Areas, Central Java Province consists of 202 watersheds [1]. Bodri is one of the degraded watersheds in Central Java that is categorized in the critical condition. Identification of the critical status of watershed was carried out by the Ministry of Forestry in 2009 by categorizing the Bodri Watershed as one of the 108 watersheds which considered as critical. This was supported by the Central Java Regional Regulation No. 15/2014 concerning Management of Watersheds in the Central Java Region [2] which states that the Bodri Watershed was included in the watersheds which should restore their carrying capacity.

The critical condition could be proven through the occurrence of land conversion causing deterioration on environmental quality. A significant amount of land use in the watershed has changed from a buffer zone to the cultivation area. Based on the Bodri Watershed performance monitoring and evaluation report [3], the size of protected forests was only around 25% of the total area of the Bodri Watershed. One of the crucial factors that triggered land conversion in the Bodri Watershed is an increase in population and socio-economic activities of the local community. Population pressure in the Bodri Watershed area was relatively high, with score > 2. This means local residents are very

dependent on processing land to fulfill their daily lives [4].

Increasing the number of residents causes uncontrolled land conversion and causes negative effects on the environment [5, 6]. In order to overcome the problems, it is necessary to integrate management in a single river basin management from upstream to downstream [7, 8].

Besides the physical problems as mentioned above, there are indications of the lack of integration of policies between stakeholders involved in the Bodri Watershed management. In practice, some problems that arise include 'silo' or locally known as *sectoral ego*. It means that putting emphasis on the interests of each sector compared to the integration and collaboration of policies between sectors. In addition, lack of coordination between related stakeholders persists has resulted in conflicts between sectors and between regions leading to ineffectiveness in watershed management. This is aligned to Tarlock's opinion [9] stating that the absence of inter-governmental coordination and cooperation may lead to ineffective watershed management as well as conflicts between sectors/activities.

This paper aims to assess the current state of governance system in Bodri Watershed management based on the Governance System Analysis (GSA) approach by analyzing three important themes: (i) the application of knowledge, (ii) the relationships or connectivity between stakeholders, and (iii) the capacity

* Corresponding author: husnafauzia@gmail.com

of stakeholders participate in Bodri Watershed management.

2 Research Method

Fig. 1 shows research area of this study, Bodri Watershed. It also a working area of Bodri Watershed Management Authority in the Central Java Province. The area consists of jurisdiction of three government regencies, namely Temanggung, Semarang, and Kendal.

Fig. 1. Administration Map of Bodri Watershed

The population in this study was stakeholders related to the management of the Bodri Watershed at various levels, which consists of 21 stakeholders. These stakeholders are: (i) central government level: Watershed Management Authority (BPDAS) Pemali Jratun and River Basin Management Authority (BBWS) Pemali Juana; (ii) provincial government level, namely: Public Work Agency for Water Resource and Spatial Planning (PUSDATARU), Environmental and Forest Agency (DLHK), Planning and Development Board (BAPPEDA), Infrastructure and Water Resource Bureau (Biro ISDA), and Food and Agriculture Agency (DPP); (ii) regency government level organisations that responsible for the environmental management, development planning, agriculture, public works, and foods as well as fisheries, (iv) non-government

institution: Central Java Watershed Forum (FORDAS Jateng) and Bodri Watershed Forum (FORDAS Bodri).

This study employs a qualitative method with the Governance System Analysis (GSA) approach [10, 11]. The method of data collection was done by conducting in-depth interviews related to the application of knowledge, stakeholder relations/connectivity and the capacity of stakeholders in Bodri Watershed management.

3 Result and Discussion

3.1 Condition of Bodri Watershed

The current condition of the Bodri Watershed is alarming. The watershed has a critical area of 14,033.51 hectares or approximately 25% of the total area of the watershed, with the most degraded area is in the upstream [12]. Agricultural activities that have not implemented soil conservation in the management of their land, are the main cause of this condition. Then, it has caused a decrease in the quality of the environment and ecosystems in the watershed. Figure 2 shows some situations in the upstream of the watershed, while Figure 3 shows some areas in Bodri Watershed which is prone to landslides, erosion, sedimentation, and flood in the rainy season, and drought in the dry season.

Fig. 2. The Condition of Upstream Area of Bodri Watershed

Fig. 3. Landslide in Purwosari Village, Wonoboyo District, Temanggung Regency

3.2 Application of Knowledge in Bodri Watershed Management

The application of knowledge in Bodri Watershed management has not been well implemented. It could be seen from the gap of studies/research conducted by the stakeholders related to Bodri Watershed management. Research outputs should be the basis of the application of stakeholders' practice related to the management of the Bodri Watershed. It is expected that the research

findings are applied in the implementation of programs/activities and should be conducted by each stakeholder. In addition, there is still a lack of training related to the Bodri Watershed management, for all stakeholders.

3.3 Stakeholder Connectivity in the Management System of Bodri Watershed

The stakeholders related to the Bodri Watershed management have established a forum (TKPSDA and Forum DAS) which consists of government and non-government elements. In the forum, relevant stakeholders have been given access to deliver problems related to Bodri Watershed management. With the existence of the forum, it is hoped that a strategy could be formulated to become a program or activity of each stakeholder in carrying out their duties related to the Bodri Watershed management. In practice, each stakeholder runs on its own. There has been weak coordination and synergy to conduct their tasks in managing the Bodri Watershed. Sectoral ego is still found and there is overlapping authority between stakeholders so that the planned arrangements do not operate as expected. Shortly, connectivity between stakeholders in the Bodri Watershed management system has not run optimally.

3.4 Stakeholder Capacity in Bodri Watershed Management

Relevant stakeholders in the Bodri Watershed management have had decision-making capacity in terms of the capacity to prepare their vision, mission, and objectives. They have been involved in the initial preparation of the Bodri Watershed's vision, mission, and objectives. The stakeholders also have the capacity to develop strategies but there are obstacles that must be addressed immediately, especially related to the inconsistency of participants who represent in the forum. For example, staff who represent the forum keep changing due to availability and task rotation. They do not strategic position in bureaucracy so that important decision or records in the forum could not be implemented properly. In addition, stakeholders at Bodri Watershed are perceived to have lack capacity in terms of research and assessment, implementation capacity/strategy implementation, and monitoring, evaluation, and review. This is caused by several factors, including a limited budget, collided with authority, not being the main task of each stakeholder, un-functioned Bappeda as the leading sector and the fact that the strategy formulation has not been included in the mid-term development plan (RPJM) as a performance indicator of each related stakeholder. Table 1, explain the detailed result of GSA.

Table 1. Matrix of GSA

Aspects	Knowledge Application	Connectivity	Participant Decision Capacity
Vision and Objective Setting	<ul style="list-style-type: none"> Formulation of vision and mission in Bodri watershed management has not been integrated between sectors, it was partially based on technical guidelines from the relevant ministries (-) Setting of Bodri Watershed management vision and objective is in line with the objectives of integrated watershed management (+) 	<ul style="list-style-type: none"> There is a watershed management forum involving multi stakeholders, namely Forum TKPSDA and Forum DAS (+) Vision and objective setting process have not involved all stakeholders related to watershed management (-) 	<ul style="list-style-type: none"> Relevant stakeholder already has capacity in vision and objective setting (+) Vision, mission and objectives of watershed management have been aligned with the vision, mission and objectives at a higher level and at the level below (+)
Research and Assessment	<ul style="list-style-type: none"> The research has not been conducted by stakeholder who in charge to manage Bodri Watershed (DLHK Central Java Province) (-) There is third party involvement in Bodri watershed management (+) 	<ul style="list-style-type: none"> Not all stakeholders which involved in Bodri Watershed management have conducted research/studies (-) The study and research were still sectoral (-) There was no joint research/studies which conducted by relevant stakeholders (-) The research/study result had not become a reference for relevant stakeholders in the Bodri watershed management (-) 	<ul style="list-style-type: none"> Stakeholders related to the Bodri Watershed management do not have the capacity yet to conduct research and studies (-)
Strategy Development	<ul style="list-style-type: none"> Not all relevant stakeholders know the basics knowledge of watershed management (-) Minimum condition of human resource (quality and quantity) (-) 	<ul style="list-style-type: none"> There has been accessed to deliver problems in each sector so that it will be formulated as the Bodri Watershed management strategy (+) 	<ul style="list-style-type: none"> Relevant stakeholders in Bodri Watershed management has the capacity to develop strategies (+) Participants who attended

Aspects	Knowledge Application	Connectivity	Participant Decision Capacity
	<ul style="list-style-type: none"> • Training for stakeholder capacity building is still limited (-) • Strategy development is often not suitable (-) • In the strategy development process, has not referred to the prepared planning documents (-) • Documents that have been developed (RPDAST) has not been internalized into each planning and development plans (RTRW and RPJMD) (-) 	<ul style="list-style-type: none"> • There is active involvement of stakeholders regarding to strategy development that needed for Bodri Watershed management (+) 	<p>the Bodri Watershed management forum was always changed and were not authorized to make decisions (-)</p> <ul style="list-style-type: none"> • Human resource quality is uneven in each stakeholders (-)
Strategy Implementation	<ul style="list-style-type: none"> • There is community involvement in Bodri Watershed management (+) • Mutual cooperation and prohibition on cutting down <i>banyan trees</i> as a form of local wisdom in the Bodri watershed management (+) • Society still have higher interest to short economic profit (-) • There is already the implementation of technology /software systems in the management of the Bodri Watershed, but not yet thoroughly in all relevant stakeholders (+/-) • Green open space in the Bodri Watershed is less than 30% which is not in accordance with existing regulations (Central Java Regional Regulation No. 6 of 2010 concerning planning documents (RTRW) of Central Java 2009-2029), namely a minimum number of RTH of 30% of the watershed area (-) • The implementation of Bodri Watershed management still does not refer to spatial plans and patterns of water resources management. This is not in accordance with Government Regulation No. 37 of 2012 concerning watershed management (-) 	<ul style="list-style-type: none"> • The formulation of the strategy that becomes a collective agreement has not been implemented by all relevant stakeholders (-) • There are budget constraints in implementing the strategy (-) • There is an understanding that the strategy which produced is not the main task of the related stakeholders (-) • Minimum role of Bappeda of Central Java Province as a leading sector in the watershed management (-) • The absence of synergy between stakeholders in Bodri Watershed management (-) • There are still sectoral egos in each parties (-) • There is overlapping policy (-) • The absence of synchronization between regulations related to watershed management (-) 	<ul style="list-style-type: none"> • The strategy is still in the form of plan / design, has not been implemented (-) • Relevant stakeholders to Bodri Watershed management do not have yet the capacity to implement the strategies because of several factors including budget constraints, understanding of some stakeholders that the strategy is not the main task force, lack of leading sector role in watershed management and the fact that the strategy has not been incorporated into RPJM which become performance indicators of each related stakeholder (-)
Monitoring, Evaluation and Review	<ul style="list-style-type: none"> • The monitoring that has been conducted is in accordance with the mechanisms and procedures for monitoring based on Regulation of Minister of Forestry No. P. 61/ Menhut-II /2014, concerning Monitoring and Evaluation of Watershed Management. (+) • The implementation of monitoring time has not referred to regulations, it should be conducted periodically at least once a year, but it is still carried out once in a period of 4 years. (-) 	<ul style="list-style-type: none"> • There are no monitoring, evaluation and review activities conducted jointly by stakeholders related to Bodri Watershed management (-) • Monitoring activities are still sectoral (-) 	<ul style="list-style-type: none"> • The capacity of stakeholders in monitoring, evaluating and reviewing Bodri Watershed management has not been optimal because it has not been implemented collectively (-) • Monitoring activities have not implemented certain technologies as supporting system in Bodri Watershed management (-)

Explanation:

(+) = Positive findings in Bodri Watershed management that need to be maintained

(-) = Negative findings in Bodri Watershed management that need to be improved

4 Conclusion

Based on the analysis results of the Bodri Watershed management using the governance system analysis (GSA) approach indicate that the Bodri watershed management has not been effective and efficient because there are still many weaknesses in almost all structures and functions in a GSA perspective. Ineffective and efficient Bodri watershed management, among others, was indicated by the lack of coordination among related stakeholders, causing overlapping policies; there are still sectoral ego in the implementation of strategy; there is no regular study/research to support Bodri watershed management; lack of commitment related stakeholders in carrying out the implementation of the strategies that have been formulated; and evaluation, review, and monitoring activities are still not routinely carried out by the relevant stakeholders. Therefore, general efforts are still needed to improve coordination, integration, synergy, and synchronization between stakeholders related to Bodri Watershed management both in the planning, implementation, control, monitoring and evaluation stages for better management of Bodri Watershed.

Acknowledgment

This research was supported and funded by the Minister of Public Work of Indonesia through the scholarship of master student in MPWK UNDIP, Semarang.

References

1. Presidential Decree No. 12, *River Basin Determination*, Indonesia (2012)
2. Regional Regulation of Central Java Province No. 15, *Watershed Management in the Central Java Province*, Indonesia (2014)
3. BPDAS, *Final Report on Monitoring and Evaluation of Bodri Watershed Management*, BPDAS Pemali Jratun (2016)
4. I. Sriyana, *Evaluation of watershed carrying capacity for watershed management (A case study on Bodri watershed, Central Java, Indonesia)*, **05003**, 1–10 (2018)
5. S. Kundu, D. Khare, A. Mondal, *Landuse Change Impact on Sub-Watersheds Prioritization by Analytical Hierarchy Process (AHP)*, *Ecol. Inform.* (2018)
6. X. Zhang, W. Cao, Q. Guo, S. Wu, *Effects of Landuse Change on Surface Runoff and Sediment Yield at Different Watershed Scales on the Loess Plateau*, *Int. J. Sediment Res.* **25**(3), 283–293 (2010)
7. R.J. Polie, V. Dermawan, *A Study of Watershed Management in Conservation of Water Resources (Case Study: Bone Watershed of Gorontalo Province)*, *Tek. Pengair.* **5**(2), 189–198 (2014)
8. E. Suganda, Y.A. Yatmo, P. Atmodiwirjo, *Environmental Management and Community Conditions in the Downstream Area of the River, Makara, Sos. Hum.* **13**(2), 143–153 (2009)
9. A.D. Tarlock, *The Potential Role of Local Governments in Watershed Management*, *Pace* **20**(1), 149–176 (2003)
10. A. Dale, K. Vella, R. Potts, *Governance Systems Analysis (GSA): A Framework for Reforming Governance Systems*, *J. Public Adm. Gov.* **3**(3), 162 (2013)
11. S. Jentoft, T.C.V. Son, M. Bjørkan, *Marine protected areas: A governance system analysis*, *Hum. Ecol.* **35**(5), 611–622 (2007)
12. BPDAS, *Bodri Integrated Watershed Management Plan (RPDAST)*, BPDAS Pemali Jratun - Semarang (2015)