USING ECOHYDRAULICS CONCEPT FOR FLOOD MITIGATION STRATEGY AT CILIMAN WATERSHED BANTEN PROVINCE INDONESIA

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Abstract— The main problem is the watershed Ciliman flooding when the rainy season comes. Watershed Flood Ciliman carry sediment mud, rocks and vegetation either side of the river who participated uprooted when the flood came toward downstream. Many areas prone to landslides that cover a total river flow. Flood mitigation has been done with pure hydraulic method. Making cibinuangeun river diversion and river normalization cilemer has been done. One alternativeis the concept of ecological hydraulic using bio-engineering methods. This study aims to apply Analisys Hierarchy Process (AHP) for decision making in the selection of priority bio-engineering methods that can be applied in flood control at Ciliman Watershed Banten Province. The method used in this study is a mixed methods (quantitative less dominant qualitative). Analysis conducted the analisys hierarchy process (AHP) to determine the selection of priority bio-engineering methods that can be applied to control flooding Ciliman Watershed Banten Province.

Keywords— Ecohydraulics, Watershed Management, Flood Control, AHP, Priority Bioengineering Methods,

I. INTRODUCTION

This study purpose is to select flood prevention strategy using ecohydraulics concept. Level I contains technical factors of resistance to river flow velocity, resistance to erosion, and resistance to sedimentation, and level II contains non-technical factors of bio- engineering method effectiveness, ease of implementation, availability of resources and technology and length of treatment. While level III contains bearing bushes, cuttings of woody plants or shrubs are stacked into cliffs and biopori infiltration holes..

II. LITERATURE REVIEW

According to Maddock (2013), river management must be done integrally and can not be done only by partially observing its hydraulic function, while its ecological function is completely ignored. Management of the river as a human effort to utilize the river as much as possible for the benefit of man and the environment is integral and sustainable, without causing damage to the regime and the ecological condition of the river concerned. Ecological and hydraulic components of a river or aquatic area have interrelated interrelations. For example in order to cope with flooding, the ecological component along the river channel can be utilized as a hydraulic retention component that can withstand the flow of water, so that there will be flood mitigation along the river channel.. Sediments are fragments of rocks, minerals or organic materials transported from various sources and distances, then deposited by air.angin. And water. In general, sediments are divided into two, ie, the bacth of rombakan or the destruction of the original rocks and materials that are not the result of destruction bedrock.

Sediments in well-dissolved rivers are found to be the result of climate-damaged rocky weathering or weathering. Some of the parent rocks are moving by surface water flowing into the rivers. River as one of the sediment transport medium has characteristic given in carrying the sediment. The volume of sediments carried by the river by Soewarno (1991) depends on the velocity of river flow.debit flow of seasonal change and human activity in the watershed .. Sediment transport by flow rivers can move, shift and leap along the river bed and drift on the transport medium itself depending on the composition of the sediment (grain size, specific gravity, specific mineral grain shape (Selley, 1988). Analytic Hierarchy Process Theory (AHP) was developed by Thomas L. Saaty a definite science expert from the University of Pennsylvania in 1971-1975. AHP allows resolving issues related to real and unreal factors. Data, ideas, and intuition can be organized using a logical hierarchical structure. Hierarchy is an arrangement of existing problem factors / elements that can be managed / controlled. In addition AHP can accommodate uncertainty and can make revisions in such a way as to the problems faced. In its development AHP is not only used to define the priority of options with many criteria or multiple criteria, but also its application has expanded as an alternative method to solve various problems. (Herjanto, 2009) One element is then compared to another based on a single criterion which is the decision process of pairwise comparisons, as well as assisting in the preparation of problems, encouraging judgment, and collecting or incorporating all considerations into prioritized alternatives from best to worst. In solving the problem with AHP there are several steps, namely: decomposition, pair comparisons, synthesis of

priority, and logical consistency. (Herjanto, 2000)

III. CONCEPTUAL MODEL & HYPOTHESIS

In this study used the method of research mix (quantitative less dominant qualitative) (Creswell, 2002). Quantitative methods are used to prioritize bio- engineering methods that can be applied in the Ciliman River Basin. Qualitative methods are conducted through interviews and questionnaires to key informants about the factors that influence the selection of bio-engineering methods. Data collection is a systematic and standard procedure for obtaining the necessary data, data collected and processed by the researcher himself from the respondent or field is called the primary data, while the data obtained from an institution or institution in the form of so-called secondary data. Primary data collection is data collection conducted by interview, or questionnaire distribution to key policy maker informants (related agencies), experts in the field of hydraulic ecology and non-governmental organizations targeted research. Primary data such as resistance to river flow, resistance to sedimentation, resistance to erosion, effectiveness of building function, ease of implementation, availability of resources and technology and maintenance period are collected in two ways: based on quizener or interview method. In the case of interviews or questionnaires, the method of data collection is done as follows: a. Conducted design of respondents who will be questioned and questioned about factors related to the performance of bio- engineering methods. Among the respondents included in the list of interviews are the eco-hydraulic policy experts of Banten Provincial Offices (5 persons), Experts of eco-hydraulic experts (3 persons) and Observers from non-governmental organizations on the environment (1 person). reaching 9 people. b. Data collection from respondents can be done by direct interviews and through questionnaires given to respondents tailored to the condition of respondents and ease of data retrieval. c. The design of questionnaires to respondents included 27 questions representing factors as measures of eco-hydraulic building performance. The quizener is designed in such a way that makes it easy to read and understand by the respondent

CONCLUSION

Based on the results of the research that has been done, it can be concluded that the final results of comparative analysis involving all the factors reviewed note that the bearing bushes are superior to the planted wooden cuttings and biopore absorption holes. This is shown from the weighting result for bearing bushes reaching 0.467, while the weights for cuttings of plantwood stalks are set to only 0.332 and the weight for the biopore absorption hole is only 0.201. The details of technical and non-technical factors that influence the priority selection of bio-engineering methods are as follows: a. The existence of technical factors based on AHP analysis, it is known technical factor that has the highest weight is the factor of resistance to erosion (0.634). This suggests that the resistance factor to erosion is considered the most important technical factor for assessing the feasibility of selecting bio-engineering methods based on respondents' assessment b. The existence of non-technical factors based on AHP analysis, known non technical factors that have the highest weight is the factor of ease of implementation (0.391). This suggests that the ease of implementation factor is the most non-technical factor considered in the selection of bio engineering methods based on respondents' assessment.

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