

Analyzing Limboto lake inundation area using landsat 8 OLI imagery and rainfall data

S Eraku*, N Akase and S Koem

¹ Department of Earth Science and Technology, Faculty of Mathematics and Science, Universitas Negeri Gorontalo, Indonesia, 96128

*narty_eraku@yahoo.com

Abstract. Limboto Lake is a natural lake located in Gorontalo Province. The condition of the lake is increasingly critical due to environmental damage and slowly loses its function. This study used Landsat 8 OLI imagery and rainfall data in the period of January 2015 to December 2016. The spatio-temporal map of the inundation area of Limboto Lake was obtained through automatic extraction method of water features with water index formula using GIS and Remote Sensing software. Analysis results based on Landsat 8 OLI image data showed that there was a large fluctuation in Limboto Lake inundation area during the study period. The largest inundation area is 4,043 ha and the smallest is 1,440 ha. This shows that the area of Limboto Lake inundation area can widen and shrink by almost 3 times. The results of analysis of rainfall data showed that large fluctuation in the Limboto Lake inundation area has a moderate correlation with the amount of rainfall that occurs. Rainfall which is the source of surface runoff and filling the Limboto Lake basin no longer has a major influence on the fluctuation of the Limboto Lake inundation area, only by 35%, there is an accumulation of other factors by 65% which is the cause the condition of large fluctuations in the Limboto Lake inundation area.

1. Introduction

Limboto Lake is a natural lake located in Gorontalo Province. The condition of the lake is increasingly critical due to environmental damage and slowly loses its function. Various efforts have been made by the regional and central government to save the lake from extinction. The most recent effort carried out by the Gorontalo Provincial Government is to include the Limboto Lake region as a Provincial Strategic Area through the stipulation of Regional Regulation (PERDA) No. 9 of 2017 concerning Spatial Planning for Limboto Lake Provincial Strategic Area, and proposes the establishment of Limboto Lake area as a National Strategic Area for the benefit of the sustainability of the lake's functions and environmental carrying capacity.

The condition of the lake where the water supply comes from rainfall directly and from the river which empties into it, will make the inundation area or water surface area of Limboto Lake very influenced by changes in the season. The average annual rainfall in the area around lake Limboto reaches 1,426 mm. Small monthly rainfall of 100 mm occurs for 3 months, namely in August, September and October. While large rainfall from 100 mm occurs for 9 months, namely in January - July and November-December [1]. Thus there will be seasonal fluctuations in the Limboto Lake inundation area depending on climatic conditions and this is important to be monitored periodically.

