

## Controlling Deforestation in the Densely Populated Region of Central Java Province, Banjarnegara District, Indonesia

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**Abstract :** As part of a tropical country that is normally rich in forest land areas, Indonesia has always been in the world's spotlight due to its significantly increasing process of deforestation. In one hand, it is related to the mainstay for maintaining the sustainability of the earth's ecosystem functions. On the other hand, they also cover the various potential sources of the global economy. Therefore, it can always be the target of different scale of investors to excessively exploit them. No wonder the emergence of disasters in various characteristics always comes up. In fact, the deforestation phenomenon does not only occur in various forest land areas in the main islands of Indonesia but also includes Java Island, the most densely populated areas in the world. This island only remains the forest land of about 9.8% of the total forest land in Indonesia due to its long history of it, especially in Central Java Province, the most densely populated area in Java. Again, not surprisingly, this province belongs to the area with the highest frequency of disasters because of it, landslides in particular. One of the areas that often experience it is Banjarnegara District, especially in mountainous areas that lies in the range from 1000 to 3000 meters above sea level, where the remains of land forest area can easily still be found. Even among them still leaves less untouchable tropical rain forest whose area also covers part of a neighboring district, Pekalongan, which is considered to be the rest of the world's little paradise on Earth. The district's landscape is indeed beautiful, especially in the Dieng area, a major tourist destination in Central Java Province after Borobudur Temple. However, annually hazardous always threatens this district due to this landslide disaster. Even, there was a tragic event that was buried with its inhabitants a few decades ago. This research aims to find part of the concept of effective forest management through monitoring the presence of remaining forest areas in this area. The research implemented monitoring of deforestation rates using the Stochastic Cellular Automata-Markov Chain (SCA-MC) method, which serves to provide a spatial simulation of land use and cover changes (LULCC). This geospatial process uses the Landsat-8 OLI image product with Thermal Infra-Red Sensors (TIRS) Band 10 in 2020 and Landsat 5 TM with TIRS Band 6 in 2010. Then it is also integrated with physical and social geography issues using the QGIS 2.18.11 application with the Mollusce Plugin, which serves to clarify and calculate the area of land use and cover, especially in forest areas—using the LULCC method, which calculates the rate of forest area reduction in 2010-2020 in Banjarnegara District. Since the dependence of this area on the use of forest land is quite high, concepts and preventive actions are needed, such as rehabilitation and reforestation of critical lands through providing proper monitoring and targeted forest management to restore its ecosystem in the future.

**Keywords :** deforestation, populous area, LULCC method, proper control and effective forest management

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