



The Application of GIS and AHP Technique for Land Suitability for Afforestation

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Forest is the main oxygen producer and it support life and all ecosystems on the Planet Earth. Due to agricultural activities, food, wood and energy production and logging, forest area is smaller each year. Climate change and more frequently natural disasters (especially drought and fire) effect forest area. According to the research of World Wildlife Fund, 18.7 million acres of forest are lost annually. Afforestation and reforestation are necessary in achieving the sustainable development goals (especially No. 15 Life on Land, No. 14 Life Below Water, No. 13 Climate Action and No. 12 Responsible Consumption and Production). The aim of this research is an algorithm that could support local and regional government in the decision making process in the forestry sector. The algorithm gives an answer to the question where making a new forest. Open source data, satellite images and earth observation data enable the analysis of soil, climate, geomorphological conditions, water, land use, infrastructure and risk. All those conditions are the criteria that determine land suitability for afforestation. In this research soil type, present and future climate conditions (temperature and precipitation), slope, aspect, soil erosion intensity, landslides, distance of water body, land use, land cover and forest aridity index are considered. Prioritization of criteria and the final algorithm was made by applying analytical hierarchy process. The next step of the research was the case study. It included the application of the algorithm in Bor, a municipality in eastern Serbia. Tree species that was considered is Black pine (*Pinus nigra*), as one of the most widely used for reforestation worldwide. To process data, we used QGIS – a free geographic information system application. The result of the research is 7.56% of the municipal district is the most suitable area for afforestation. Validation of the results included field work and comparison with NDVI (normalized difference vegetation index) result. The research was a part of Forest and Climate project, that was supported by the Ministry of Environmental Protection.