عنوان مقاله:

Carbon stock dynamics of forest to oil palm plantation conversion for ecosystem rehabilitation planning

محل انتشار:

تعداد صفحات اصل مقاله: 22

نویسندگان:

D. Frianto – Office for Standard Implementation of Environment and Forestry Instrument Kuok, Ministry of Environment and Forestry Republic of Indonesia

E. Sutrisno – Office for Standard Implementation of Environment and Forestry Instrument Kuok, Ministry of Environment and Forestry Republic of Indonesia

A. Wahyudi – Office for Standard Implementation of Environment and Forestry Instrument Kuok, Ministry of Environment and Forestry Republic of Indonesia

E. Novriyanti – Research Center for Biomass and Bioproduct, Research Organization for Life Science and Environment, National Research and Innovation Agency, Cibinong, ۱۶۹۱۱۱, Indonesia

W.C. Adinugroho – Research Center for Ecology and Ethnobiology, Research Organization for Life Science and Environment, National Research and Innovation Agency, Cibinong, ۱۶۹۱۱۱, Indonesia

A.S. Yunianto – Research Center for Ecology and Ethnobiology, Research Organization for Life Science and Environment, National Research and Innovation Agency, Cibinong, ۱۶۹۱۱۱, Indonesia

H. Kurniawan – Research Center for Ecology and Ethnobiology, Research Organization for Life Science and Environment, National Research and Innovation Agency, Cibinong, ۱۶۹۱۱۱, Indonesia

H. Khotimah – Research Center for Behavioral and Circular Economics, Research Organization for Governance, Economy, and Public Welfare, the National Research and Innovation Agency, Cibinong, ۱۶۹۱۱۱, Indonesia

A. Windyoningrum – Center for Standardization of Sustainable Forest Management Instruments, Ministry of Environment and Forestry, Bogor, Indonesia

I.W.S. Dharmawan – Research Center for Ecology and Ethnobiology, Research Organization for Life Science and Environment, National Research and Innovation Agency, Cibinong, ۱۶۹۱۱۱, Indonesia

H.L. Tata – Research Center for Ecology and Ethnobiology, Research Organization for Life Science and Environment, National Research and Innovation Agency, Cibinong, ۱۶۹۱۱۱, Indonesia

S. Suharti – Research Center for Ecology and Ethnobiology, Research Organization for Life Science and Environment, National Research and Innovation Agency, Cibinong, ۱۶۹۱۱۱, Indonesia

H.H. Rachmat – Research Center for Behavioral and Circular Economics, Research Organization for Governance, Economy, and Public Welfare, the National Research and Innovation Agency, Cibinong, ۱۶۹۱۱۱, Indonesia

E.M. Lim – Department of Environmental Planning, Graduate School of Environmental Studies, Seoul National University, Seoul ۰۸۸۲۶, Republic of Korea

خلاصه مقاله:

BACKGROUND AND OBJECTIVES: Efforts to enhance carbon stocks and boost carbon absorption potential are essential for climate change mitigation. Peatland ecosystems, known for their high organic content, are particularly vulnerable to environmental management. The study aimed to examine the alterations in land use and land cover that occurred between ۱۹۹۸ and ۲۰۲۲, spanning a ۲۴-year duration. Additionally, it sought to assess the associated variations in carbon stocks within the designated Kepau Jaya specific purpose forest area. The area under investigation encompasses a peatland ecosystem that has experienced substantial changes in land cover and land use. This study investigated the fluctuations in carbon stock caused by these alterations and provides valuable perspectives on the potential of agroforestry systems to promote a wider range of land uses. Additionally, it highlights their role in ecosystem restoration initiatives and the better management of forest peatland regions.METHODS: A spatial analysis was conducted on Landsat ۵ and ۸ satellite images by using shapefile data stored within the Google Earth Engine platform. Data analysis was carried out using Classification and Regression Tree, a decision tree algorithm used in machine learning for guided classification. Furthermore, purposive sampling was utilized to gather socioeconomic data, followed by the implementation of a benefit-cost analysis.FINDINGS: The results revealed significant changes in the land cover within the Kepau Jaya specific purpose forest area over a ۲۴-year period, with forested areas and open areas decreasing by ۲۳.۱۵ hectares per year and ۱۶.۹۴ hectares per year respectively, and oil palm plantation areas expanding by ۴۰.۱۰ hectares per year. From ۱۹۹۸ to ۲۰۲۲, there has been a consistent annual decline in carbon stocks, resulting in a reduction of ۱,۹۳۳.۱۱ tons of carbon per year. The changes in land use and cover are closely linked to this decline. In an effort to increase plant species diversity in the area and support the gradual transition away from monoculture, a participatory agroforestry scheme was implemented by intercropping Coffea liberica and Shorea balangeran between oil palm rows in a ۲-hectare oil palm plantation block within the agroforestry demonstration plot. According to measurements taken at breast height, the aboveground biomass of these species was measured, leading to projected estimates of carbon stocks in Kepau Jaya specific purpose forest area reaching ۱۹,۴۵۵ tonnes of carbon by the year ۲۰۳۰, with Coffea liberica contributing ۴,۱۴۸ tonnes carbon ...

کلمات کلیدی:

Agroforestry, Carbon stock, Climate change, Ecosystem rehabilitation, Land cover change

لینک ثابت مقاله در پایگاه سیویلیکا:

https://civilica.com/doc/2055386