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Perspective

Environmental impacts and eco-friendly farming systems

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DESCRIPTION

Intensive agricultural systems are under unprecedented strain as a result of the issue of supplying the growing food demand and the requirement to do so using environmentally friendly and socioeconomically acceptable ways. There is insufficient evidence to support the integration of socioeconomic benefit and environmental harm. The yield performance, environmental burden (measured by the seven mid-point environmental impact categories, particularly for the Global Warming Potential (GWP) in terms of greenhouse gas emissions), and financial advantages among various intensive farming systems with varying agricultural resource input in maize production (Bhuiyan, et al. 2021). Under intensive agricultural systems, seed yields rose as inputs of resources rose. With rising resource inputs, there was a significant rise in the environmental load as measured by GWP and Integrated Environmental Effects (IEI) based on per unit grain yield generated (Corato, 2020). The traditional planting had the poorest environmental results, as indicated by the greatest IEI, which was primarily caused by higher agricultural resource input (such as fertilizer and diesel fuel usage) per unit of grain yield generated, increasing GWP and abiotic element depletion. While excessive resource input planting patterns were not encouraged due to the yield penalty, poor net revenue, and significant environmental burden, they might be highly suggested to local farmers for their relatively reduced resource input when combined with water-saving technology (Elsallam, et al. 2021). Under intensive farming systems, the significance of making wise use of agricultural resources and cutting-edge water-saving technologies for reducing environmental risks and securing global food supply. Due to rising concerns about the economy, society, and environment, as well as concerns about the effects of climate change and the depletion of fossil fuel supplies, lignocellulosic wastes have attracted a lot of attention recently. Pollution is brought on by the improper handling of lignocellulosic resources and associated organic wastes (Karuppiah, et al. 2021). However, lignocellulosic wastes have a great deal of economic potential and may be used as promising catalytic supports due to impressive characteristics including surface area, porous structure, and the presence of several chemical moieties i.e., carboxyl, amino, thiol, hydroxyl, and phosphate groups.

To achieve sustainable grain production, more farmers must be encouraged to use eco-friendly fertilizing techniques. Using a logistic regression model, three mutually enhancing spatial analysis models, and a spatial-econometric analytical framework, it is possible to systematically investigate the variables influencing farmers' adoption of such equipment (Mencia-Ares, et al. 2020). By combining information from remote sensing, agricultural quality studies, household surveys, and a digital elevation model. Major socioeconomic influencing elements include the size of the farm, the degree of agricultural fragmentation, and the age and education of the family head. Major geographic influencing factors include topsoil thickness, drainage capacity, and irrigation capacity. Farmers' readiness to accept new technology is also significantly influenced by the kind of technology promoter and how valuable they feel it to be (Pathak, et al. 2022). More effort should be directed on farmers who are more educated, younger, and have larger plots of land under cultivation in order to improve the likelihood that they will adopt new technologies. During the technology promotion process, non-adopter-dominated regions should also be the focus. Additionally, local officials must to take considerable action to encourage technology users to become active technology boosters. To minimize the negative effects of the agricultural industry on the environment, eco-compensation is crucial for developing ecologically intensive agriculture (Quelen, et al. 2021). The ability to measure eco-compensation is still lacking, nevertheless, due to the lack of an all-inclusive, performance-based methodology. A thorough model of eco-

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*Corresponding author. Ram Swaroop Meena, E-mail: meenaroopr@msr.ac.in compensation standards based on internal and external trade-offs and their valuation techniques based on farm-level cost-benefit analysis. The internal economic costs and benefits using traditional life cycle costing and profit analysis. According to the revealed preference technique and the Environmental Priorities Strategies model, the ecosystem service and disservice values were recorded as external benefits and costs (Saleem, et al. 2022). Depending on anthropogenic ecological constraints on natural resources and biogeochemical cycles, ecological assessment methodologies evaluate varying levels of comprehensiveness. The possibility for integrating biomass into agricultural operations was assessed, and low-impact ecological processes were used to replace all phases of their whole life cycles. The Sustainable Process Index is a method that provides a thorough analysis of the world's resource availability, life cycle chains, and emissions to ultimate compartments on the earth's spheres. Traditional agricultural cropping practices should be compared to a robust, sustainable ecological footprint, which might be attained if heavy footprint measures were swapped out for ones that had less of an influence on natural cycles. In order to identify ecological hotspots, maize grain output is assessed. It is compared to standard conventional agricultural practices and ecological/organic farming practices. The assessment's findings showed that the primary ecological hotspots are the use of fossil fuels and the application of mineral fertilizers and pesticides.

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