Pine Needle Management for Biofuel in District Hamirpur, Himachal Pradesh

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Abstract

The increasing demand for sustainable energy solutions has driven interest in utilizing agricultural and forest waste as alternative energy sources. This study explores the potential of moulding pine needles into compact firewood, addressing both environmental and energy challenges. Pine needles abundant in many forest regions, are often regarded as waste or a fire hazard. Its use as firewood will provide a sustainable solution for energy generation while reducing risk of forest fire. This research enables the feasibility of Pine Needles as a biofuel. Various binders and moulding techniques were examined to produce usable and efficient firewood briquettes or moulds. This experimental research study focusses on optimizing compression, binder composition to achieve high energy output and binding strength. This study aims to provide an eco-friendly alternative to conventional firewood and promote sustainable waste management practices. The findings could benefit rural and urban communities seeking cost effective, renewable energy sources while contributing to forest conservation efforts.