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Charcoal Production from Invasive Species: Suggested Shift for Increased Household Income and Forest Plant Diversity in Nepal

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Abstract : Invasive Alien Species (IAS) are considered waste forest resources in Nepal. The rapid expansion of IAS is one of the nine main drivers of forest degradation, though the extent and distribution of this species are not well known. Further, the knowledge of the impact of IAS removal on forest plant diversity is hardly known, and the possibilities of income generation from them at the grass-root communities are rarely documented. Systematic sampling of 1% with nested circular plots of 500 square meters was performed in IAS removed and non-removed area, each of 30 hectares in Udayapur Community Forest User Group (CFUG), Chitwan, central Nepal to observe whether the removal of IAS contributed to an increase in plant diversity. In addition, ten entrepreneurs of Udaypur CFUG, involved in the charcoal production, briquette making and marketing were interviewed and interacted as well as their record keeping booklets were reviewed to understand if the charcoal production contributed to their income and employment. The average annual precipitation and temperature of the study area is 2100 mm and 34 degree Celsius respectively with Shorea robusta as main tree species and Eupatorium odoratum as dominant IAS. All the interviewed households were from the'below-poverty-line' category as per Community Forestry Guidelines. A higher Shannon-Weiner plant diversity index at regeneration level was observed in IAS removed areas (2.43) than in control site (1.95). Furthermore, the number of tree seedlings and saplings in the IAS harvested blocks were significantly higher ($p < 0.005$) compared to the unharvested one. The sale of charcoal produced through the pyrolysis of IAS in' Bio-energy kilns' contributed for an average increased income of 30.95 % (Nepalese rupees 31,000) of the involved households. Despite above factors, some operational policy hurdles related to charcoal transport and taxation existed at field level. This study suggests that plant diversity could be increased through the removal of IAS, and considerable economic benefits could be achieved if charcoal is substantially produced and utilized.

Keywords : briquette, economic benefits, pyrolysis, regeneration
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