

## Evaluation of Potential of Crop Residues for Energy Generation in Nepal

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**Abstract :** In Nepal, the crop residues have often been considered as one of the potential sources of energy to cope with prevailing energy crisis. However, the lack of systematic studies about production and various other competent uses of crop production is the main obstacle to evaluate net potential of the residues for energy production. Under this background, this study aims to assess the net annual availability of crop residues for energy production by undertaking three different districts with the representation of country's three major regions of lowland, hill, and mountain. The five major cereal crops of paddy, wheat, maize, millet, and barley are considered for the analysis. The analysis is based upon two modes of household surveys. The first mode of survey is conducted to total of 240 households to obtain key information about crop harvesting and livestock management throughout a year. Similarly, the quantification of main crops along with the respective residues on fixed land is carried out to 45 households during second mode. The range of area of such fixed land is varied from 50 to 100 m<sup>2</sup>. The measurements have been done in air dry basis. The quantity for competitive uses of respective crop residues is measured on the basis of respondents' feedback. There are four major competitive uses of crop residues at household which are building material, burning, selling, and livestock fodder. The results reveal that the net annual available crop residues per household are 4663 kg, 2513 kg, and 1731 kg in lowland, hill, and mountain respectively. Of total production of crop residues, the shares of dedicated fodder crop residues (except maize stalk and maize cob) are 94 %, 62 %, and 89 % in lowland, hill, and mountain respectively and of which the corresponding shares of fodder are 87 %, 91 %, and 82 %. The annual percapita energy equivalent from net available crop residues in lowland, hill, and mountain are 2.49 GJ, 3.42 GJ, and 0.44 GJ which represent 30 %, 33 %, and 3 % of total annual energy consumption respectively whereas the corresponding current shares of crop residues are only 23 %, 8 %, and 1 %. Hence, even utmost exploitation of available crop residues can hardly contribute to one third of energy consumption at household level in lowland, and hill whereas this is limited to particularly negligible in mountain. Moreover, further analysis has also been done to evaluate district wise supply-demand context of dedicated fodder crop residues on the basis of presence of livestock. The high deficit of fodder crop residues in hill and mountain is observed where the issue of energy generation from these residues will be ludicrous. As a contrary, the annual production of such residues for livestock fodder in lowland meets annual demand with modest surplus even if entire fodder to be derived from the residues throughout a year and thus there seems to be further potential to utilize the surplus residues for energy generation.

**Keywords :** crop residues, hill, lowland, mountain

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