

Abstract

Forest degradation affects ecosystem functionality and causes the loss of potential ecosystem services. Ecosystem functions are recognized as services when there are human beneficiaries and stakeholders of all levels that are influenced by their supply. Current study focused on the assessment of some structural attributes, habitat quality and avoided runoff service of Hayat ul Mir (HM) forest, Soan valley. The objective of this study was to quantify and value ecosystem services by using different softwares i-Tree Eco and inVEST. For i- Tree Eco, sample inventory analysis was performed to calculate structural features and avoided runoff valuation. Field data was collected from 31 plots (20m X 20m) of the forest. inVEST model was used for habitat quality analysis. For this purpose, some data was obtained through expert valuation method while coordinates were taken to generate input maps during field surveys. i-Tree Eco showed projected estimations for structural features and avoided runoff service based on sampled data. Projected estimations showed the total tree population for Hayyat ul Mir forest as 55,581,584 including *O. ferruginea* as 30,464,542, *A. modesta* as 13,611,817 and *P. juliflora* having 11,505,226 number of trees. Run off reduction by whole HM forest is projected as 3,143,384 m³/yr with environmental benefits of Rs. 921,737,611 annually in which *O. ferruginea* contributes as 1,786,050 with benefit price of 523,725,180, *A. modesta* as 880,647 with benefit price of 258,233,051 and *P. juliflora* as 476,687 m³/yr with benefit price of 139,779,379 annually. The results of habitat quality model showed the maximum degradation as 0.312 out of 1 indicating the approximately 30% of the degradation in the forest. While the map for habitat quality showed 1 value for some areas which is indicating their best suitable habitat quality for the biodiversity and less than 1 value for remaining areas showing their poor quality of habitat due to the presence of some threat factors.