

>> SYNTHESIZE MOUNTAINS OF KNOWLEDGE <<

## Submitted Abstract

ID IMC22-FSAbstr- 300

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<b>Country</b>	Bangladesh, People's Republic of
<b>Region</b>	Asia
<b>Title</b>	Quantification And Trade-Off Of Ecosystem Services In Response To Land Use Land Cover (Lulc) Changes In Hindu Kush Himalaya (Hkh)-A Case Study From Chittagong Hill Tract (Cht) Region Of Bangladesh.
<b>Keywords</b>	Hindu Kush Himalaya, Nature-Based Solution, Ecosystem Services Value, Tradeoff/synergy, Bangladesh.
<b>Type</b>	List Of Focus Session
<b>Focus Session ID</b>	02

## Abstract

The Hindu-Kush-Himalaya (HKH) region is one of the most diversified mountain ecosystems in the world, including 60 ecoregions and habitat for 240 million people. However, intensive human intervention has altered the natural landscapes that need to be managed sustainably to ensure the long-term provision of ecosystem services (ESs) in this region. The concept of Nature-based Solutions (NbS), which connected the people in maintaining the ecosystem, addresses such challenges, however, requires thinking in terms of socio-ecological systems. Understanding the spatiotemporal connections between people and ecosystems is critical for decision-makers to implement sustainable management strategies and NbS that can enhance the resilience of social-ecological systems. However, studies on the impact of land-use changes (LULC) on ESs and their trade-off relationship are still unrepresentative in this region. With this in mind, this study estimated the impact of LULC changes on the ecosystem services values (ESVs) and their trade-off & synergies in the Chittagong Hill Tract (CHT) region of Bangladesh. The current research analyzed the trend of land-use changes between 2000 and 2020 and their impact on ESVs using a benefit transfer approach. Correlation analyses were used to determine the temporal trade-offs and synergistic relationships among ESs. The findings indicated that the dramatic increase of settlements caused an ongoing shift of grassland toward more human-modified land-use types (e.g. urban land use) during 2000-2020. These land-use changes resulted in a net decline of 1.7x10<sup>6</sup> USD of ESVs in the CHT region during the study period. This loss was mostly due to the conversion of grassland to settlements. Likewise, the findings indicate that nutrient cycling, climate regulation, raw material production, erosion control, and water regulation are the most important individual ecosystem service functions, accounting for 82.71 % (2020) and 82.14 % (2000) of total ESVs, respectively. However, there was a negative trend in the function of individual ecosystem services. Synergy accounts for 57.03% of ecosystem service interactions in the CHT region, with fewer trade-off exchanges. This synergy mainly exists in the relationships involving food production, raw materials, water regulation, erosion control, climate regulation, recreation, and culture and tourism. The results suggest that quantification of multiple ecosystem service values and their synergies can provide a good basis to promote sustainable development in mountain landscapes.