?Climate change and its impacts on the Ecosystem services.

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(a) Purpose of study or research hypothesis

?This study aims to provide an overview of ecosystem services (hereafter called ES) provision under land use change and climate change in the Bagmati basin of Nepal. ES accessed in this study are

1. Water yield (Fresh water availability and flood retention)
2. Soil health (Soil loss and retention)
3. Carbon storage and fluctuation.
4. Nitrogen retention and export (Water quality).

(b) Key issue(s) or problem(s) addressed

1. Assessment of Land use and land cover conversion and its impacts on the provision of ES.
2. Projection of climate data (Rainfall and Temperature) based on MME of GCM data up to 2099 and evaluation of ES based on this data.

(c) Methodology or approach used

Integrated Valuation of Ecosystem services and Trade-offs (InVEST) model developed by Standard University Nat Cap project is used to evaluate Water yield, Carbon and Nitrogen. Revised Universal Soil Loss Equation (RUSLE) is used to evaluate soil loss and APCC Integrated Modeling Solution(AIMS) is used to downscale GCM for climate data. Evaluation of ES was done based on these data and comparative study is made for 7 sub-basins of bagmati basin for 2000, 2010 and future period (S1: 2010-2039, S2:2040-2069, S3:2070-2099).

(d) Results or conclusions derived from the project

This study firstly accessed ES based on the 2000 and 2010 land use map and then with the baseline land use map of 2010 and projected climate data from MME of 12 GCMs, ES provision on future period was estimated. The overall provision of combined ES on sub-basin 2 is lowest in 2000, 2010 and all future climate scenarios. As well, the provision of ES is observed to be decreasing in all other sub-basins. Outcomes like increased water yield, reduced carbon storage, increased nitrogen export, and soil loss, suggest that immediate actions are required from the policy level for sustainable management of natural capital. The ecosystem services are interrelated and in absence of adequate design to sustain one, it can hamper other provisions as well.

(e) Implications of the project relevant to congress themes

As the theme says "repairing impacts and preventing damage", the first hand information on where the ES are generated, how they are stored and exported and how LULC conversion and climate change affect their provision can help land use planners, government organizations or any concerned stakeholders in decision making for optimum utilization of resources to maintain ecological balance and economic goals.

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