the monetary value of ecological functions performed and consequently annual economic benefits derived. The specific objectives were to find out answers to the questions such as: what would be the annual monetary value of gene pool preservation, biodiversity conservation, or carbon sequestration by forests. Methods followed in the two-year study period (2008-2010) include: review of existing literature such as the Management Plan of the Park, generate primary data of productivity where not available through survey and field work; calculate the annual yield with help of Smithies and Howard (1923) Yield Table; assign prices with the help of Travel Cost Method or with the help of Opportunity Cost Approach as a Valuation Technique; analyze primary and secondary data; and culminate the process into the annual monetary value of each of ecological function, carbon sequestration and biodiversity conservation. Results have established that: i. CNP exists with one third for direct value, one third for indirect value and one third for non-use value; ii. Total Economic Value (TEV) annually of the ecosystem functions and services is equivalent to $28.4 million; iii. Annual monetary value of carbon sequestering is $8.64 million; and iv. Monetary value of ecological functions flow is equivalent to $1.6 million per annum. Conclusions infer that Corbett National Park gives a true value of $37.3 million annually to the national wealth, which is almost eight times the accounted value. Also, its contribution to national wealth is much undervalued. Based on the study, models can be developed for assessing total economic value of similar areas. The need is to explain the environmental conservation in terms of economic parameters for better attention of both the policy makers and society at large belonging specifically to developing countries.

Key words: total economic value, Jim Corbett National Park, ecological function, opportunity cost approach.
Acknowledgements: Pre thesis work of Dr. J V Sharma India (unpublished), Uttarakhand Forest Department literature andrecords.

Deforestation, climate, and water regimes interactions in the southwestern Amazon

Letícia Santos de Lima[a]*, Britaldo Soares Filho[a], Michael Thomas Coe[b], Santiago Viana Cuadra[c], Lívia Cristina Dias[d], Marcos Heil Costa[d]

*Corresponding author: [a]Centro de Sensoriamento Remoto - Universidade Federal de Minas Gerais, Av. Antônio Carlos, 6627, IGC sala 206. Belo Horizonte - MG, CEP 31270-900 Brazil, [b]The Woods Hole Research Center, [c]Centro Federal de Educação Tecnológica Celso Suckow da Fonseca, [d]Universidade Federal de Viçosa. leticialima@csr.ufmg.br

The southwestern Amazon water regime has been changing in the last decades due to a variety of local and regional processes. Extreme climate events have been happening in recent years, as for example, the droughts of 2005 and 2010, and also floods as in 2009 and 2012. Natural climate shifts, global warming, and deforestation could interact to create a complex scenario. Among these processes, deforestation is expected to have a strong impact on river discharge. If only local effects are taken into account, deforestation usually leads to an increase in river discharge. However, large-scale forest removal could also affect precipitation patterns in a way that the effects on river discharge would be more complex to analyse. Using coupled atmosphere-biosphere simulations, we analysed the effects of large-scale deforestation throughout the Amazon basin on the water regime of the Purus and Juruá sub-basins. According to our simulations, if climate feedbacks are considered, deforestation is expected to have an impact in the dry season length, increasing it up to one additional month. The simulations also point to a possible decrease in the annual mean discharge of Juruá river up to 20% and 18% for the Purus river. However, if the climate feedbacks are not considered, the simulations show that Juruá and Purus rivers would have an increase in discharge of up to 21% and 23%, respectively, considering a scenario of about 40% of forest removal on those sub-basins.

Key words: land use change, deforestation, climate, hydrology, rivers.

Acknowledgements: This work was supported by grants from the Gordon and Betty Moore Foundation (USA) and Coordenação de Aperfeiçoamento de Pessoal de Nível Superior CAPES (Brasil).