



The Impact of Land Use and Land Cover Change on Water Yield in the Jing- Jin-Ji Region in China

Suxiao Li (1,2) and Hong Yang (2)

(1) Beijing Forestry University, Beijing, China, (2) Eawag, Swiss Federal Institute of Aquatic Science and Technology, Dübendorf, Switzerland

Water yield is one of the key ecosystem services sustaining both people's life and economic development. However, the water yield function is sensitive to anthropogenic activity especially the land use and land cover change (LUCC). Assessment of historical LUCC and its impact on water yield could benefit designing and implementing appropriate land use strategy that enhance the water yield capacity. Beijing (Jing) and its surrounding areas of Tianjin (Jin) and Hebei (Ji) is the political, cultural and economic center of China. The region is facing increasingly water crisis. Taking the Jing-Jin-Ji region as a study area, this study analyzed the historical LUCC and its impact on water yield by using the Integrated Valuation of Ecosystem Services and Tradeoffs (InVEST) model to spatially map and quantify the changes of water yield from 1995 to 2010. The results showed there was main decline in area of wetland and forest and increase in area of crop land and built up land. An abrupt decline in water yield was found for year 2000. The water yield was influenced to a great extent by precipitation and evapotranspiration, but the land use played an important role in the water yield capacity (water yield per unit area) through plant cover that affected evapotranspiration, soil water permeability and the capacity of holding the moisture content. By general ranking, the water yield capacity of different land use type was as follows: built-up>bare land>cropland> grassland>forest >wetland, which illustrated that the built-up and bare land had higher run off rate while the vegetation area had higher capacity to control surface run off to increase the groundwater. A good understanding of temporal-spatial allocation of historical LUCC and Water yield of the Jing-Jin-Ji region could help guide land use policy decisions that take into consideration of tradeoffs with respect to spatial distribution of ecosystem services amongst the three administrative entities (Jing-Jin-Ji) and tradeoffs between the economic and ecological development.