



## Tuul River Watershed Services, Mongolia

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**Short title:** Watershed services crucial for economic development, Mongolia

**Key Message:** If the Upper Tuul river ecosystem continues to be degraded, the loss of watershed services will cost the Mongolian economy a total of USD 338 million over the next 25 years.

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Picture 1: A panoramic view of Gachuurt Khoroo, China  
*Courtesy: Lucy Emerton*



Picture 2: GorkhiTerelj, China  
*Courtesy: Lucy Emerton*

### 1. What is the problem?

Ulaanbaatar is Mongolia's centre for commerce and industry and generates nearly 70 percent of national production. It has over one million people, 20,000 industries and businesses and 400 hectares of irrigated farms. The Upper Tuul Valley is arguably the most important ecosystem in the country because it serves as the source of all of Ulaanbaatar's water and also as a major domestic and international tourism centre for Mongolia.

A healthy upstream ecosystem helps to ensure a clean and regular groundwater resource for Ulaanbaatar. But the Upper Tuul watershed is being degraded due to deforestation through pasture and timber production, which is caused by development in the area and increasing resource demands. As a consequence, the city faces problems with its water supply, as the demand for water is greater than the ability of the aquifer to recharge. As the Upper Tuul ecosystem is degraded and land cover is lost, more shortages of water are to be expected. It is therefore necessary to assess the economic impacts of Tuul watershed

degradation, so that there is recognition that appropriate policies are required in response to these problems.

## **2. Which ecosystem services were considered?**

The Government of Mongolia and the World Bank initiated a study to better understand the ways in which the natural environment contributes to the economy. The Upper Tuul valley provides various ecosystem services, the most important being the supply of clean water. The other ecosystem services include: every year almost a million bed nights are spent in the Upper Tuul, around 170 thousand hectares of land are used for grazing and just under 8,500 cubic meters of firewood, 3,300 cubic meters of timber and 20,000 kg of fruits, berries, wild vegetables, pine nuts and medicinal plants are harvested. The analysis focuses on these services and the costs that occur due to the loss of these ecosystem services.

## **3. What approach was taken?**

The study integrates economic valuation and eco-hydrological analysis. The eco-hydrological analysis is based on a modelling system. The Integrated Hydrological Modelling System is a computerized catchment model that converts precipitation; evaporation and snow melt into stream flow/reservoir inflow, by simulating natural hydrological processes.

The methodology for valuing ecosystem services comprised of revealed preference, stated preference, and cost-based techniques to value ecosystem services. The study looked at the value of water supplies, tourism earnings, livestock production, and income from timber, firewood, and non-forest product harvesting.

Changes in economic value were examined arising from three different watershed management scenarios: a gradual ecosystem degradation (that is a continuation of the status quo), a rapid resource depletion and land degradation scenario, and finally a conservation and sustainable use scenario. With a combination of household interviews, local government data, primary data collection, computer modelling, and good GIS analysis, a conservative yet considerable estimate of the value of the Upper Tuul ecosystem was estimated.

The study found that the Upper Tuul watershed generates valuable ecosystem services, which benefit local communities, the residents of Ulaanbaatar, and even the global community. The conservation and sustainable use scenario is estimated to yield a Present Value, over 25 years, of USD 1.15 billion (Tug 1,370 billion)<sup>1</sup>. This is appreciably higher than the Present Values generated under either a continuation of the status quo at USD 1.09 billion (Tug 1,293 billion), or a scenario of rapid ecosystem degradation amounting to USD 1.05 billion (Tug 1,243 billion). Looking at the additional water values generated, the study findings suggest that every Tug 1 invested in conserving the Upper Tuul ecosystem would generate economic benefits of more than Tug 15. Furthermore, the analysis found that ecosystem degradation has serious economic and development consequences, which will cause the Mongolian economy a total loss between USD 338 million (Tug 400 billion) and USD 528 million (Tug 625) billion over the next 25 years (starting 2009).

The study also shows that the two protected areas in the Upper Tuul watershed, receive funding that is much lower than the amount of economic benefits they provide to the watershed. The public budget levels, at the time of writing the case, were insufficient to manage the protected areas effectively. The study recommends further funding to be put aside for the park management. Furthermore, the study suggests that there is a potential for

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<sup>1</sup> At an exchange rate as of 31<sup>st</sup> Dec 2007

payments for ecosystem services, where landowners are paid for the ecosystem services they generate.

#### 4. What was the policy uptake?

While there was no policy uptake, the study recognizes that the key challenge is the development of long term incentives for conservation, as in the short term, land and resource users can generate more income from degrading the watershed, even if these values will degenerate overtime.

#### Reference:

Emerton, L., N. Erdenesaikhan, B. De Veen, D. Tsogoo, L. Janchivdorj, P. Suvd, B. Enkhtsetseg, G. Gandolgor, Ch.Dorisuren, D. Sainbayar, and A. Enkhbaatar. 2009. *The Economic Value of the Upper Tuul Ecosystem*. Mongolia Discussion Papers, East Asia and Pacific Sustainable Development Department. Washington, D.C.: World Bank.

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Picture 3: GorkhiTerelj, China  
Courtesy: Lucy Emerton



Picture 4: Another view of the Tuul river near GorkhiTerelj,  
China  
Courtesy: Lucy Emerton