

## **Experience of forest ecosystems sustainability enhancement in the basins of transboundary rivers of Kyrgyzstan as a measure of climate change adaptation**

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Mountain forests of Tien Shan mountain system impact water supply of transboundary rivers significantly. Growing on mountain slopes and flood-plains the forests influence formation of air flows in lower layers of the atmosphere, air and soil temperature, wind regime, accumulation and distribution of precipitation on the territory and so called mesoclimate. The forests facilitate prevention of mudflows, hinder formation of landslides and avalanches in the mountains, and regulate runoff in the rivers making it more uniform during the year.

The crisis of transition period aggravated the issues related to natural resources conservation. Being impacted by anthropogenic thinning and reduction of the area of mountain and flood-plain forests, all the above-mentioned functions of the forests are changed sharply. These changes change mesoclimate and the forest loses its important water protection functions. This affects mountain ecosystems sustainability. Degradation of forest vegetation and related reduction of precipitation cause reduction of glaciers area. Loss of glaciers will cause reduction of total surface runoff. Surface and underground waters in the basins of transboundary rivers – the Chu, Talas and Sur-Darya Rivers – are related closely and in a complicated manner. Seepage loss of the river flow of multiple tributaries flowing down from the mountain frame is the main source of underground waters formation. The largest fresh water deposits that are sources of drinking water supply for all settlements located nearby are related to river valleys. Thus, anthropogenic thinning and reduction of the area of mountain and flood-plain forests causes depletion of water resources as a whole.

Afforestation of mountain slopes and flood-plains facilitates mesoclimate change and reduction of degradation of glaciers and water resources in general. Increasing percentage of forest land of the river basins by means of forest plantation is one of the ways to address climate change adaptation problem in all river basins in Tien Shan mountain system, where transboundary rivers – the Chu, Talas and Syr-Darya Rivers - originate. Lack of funding and land plots allocation for rural population that decided to plant the forests represent important factors that hinder the progress in this regard. Experience of the projects implemented by the Institute of Water Resources Ecology and Desertification Problems (IWREDP) in the transboundary rivers - the Chu, Talas and Syr-Darya Rivers – under the support of the international agencies (the Secretariat of the Convention to Combat Desertification and Drought, FAO and GEF) demonstrates an opportunity for successful interaction between public and private sectors and the NGOs upon addressing the issues related to afforestation and rehabilitation of pasture vegetation. Rising awareness and training of local communities were focused during implementation of these projects. More than 215 000 trees were planted by the residents of 28 mountain villages of transboundary river basins in Talas and Jalal-Abad oblasts with financial support of the projects. More than half of these trees were endemic and fast growing wood species that in the near future could be used as firewood and timber thus reducing pressure on natural forest ecosystems. To preserve forest ecosystems, water resources and to change the current situation there is special necessity for the individuals responsible for policy making and policy planning to recognize positive impacts of the forests on water resources. For example, more focus should be made on important role of the forests in the basin management plans, disaster risk management plans, local governments' and farmers' plans. These issues deserve greater coverage in the relevant legislative acts that regulate water resources and in reference literature dedicated to optimal agricultural practices.