



Water consumption of agriculture and natural ecosystems at the Amu Darya in Lebap Province, Turkmenistan

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The Amu Darya is the main water source for whole Turkmenistan, but also for the regions Khorezm and Karakalpakstan in Uzbekistan. Due to the arid climate in the Amu Darya river basin, agriculture depends on irrigation with river water being the major source of water. Also the natural ecosystems depend on river water. Until end of the 1970s, the Amu Darya flew into the Aral Sea and, together with the Syr Darya, sustained its water level. From the 1960s until today the area under irrigation has been strongly enlarged. During Soviet Union times, mainly cotton was planted on the newly reclaimed land. After independence, new land was reclaimed, in order to grow wheat. In the course of this land reclamation, the downstream section of the Amu Darya, i.e. in Karakalpakstan faces severe water shortage. Today, the Amu Darya only occasionally reaches the previous shore line of the Aral Sea. Against this background, it is necessary that water consumption along the Amu Darya is limited and water is used efficiently, in order to ensure water supply for downstream water users. The province Lebap in Turkmenistan is located at the middle reaches of the Amu Darya. Thus, it is an example of an administrative unit, which consumes water from the Amu Darya and which should release a sufficient amount of water downstream. Furthermore, Lebap harbours one of the last near-natural riparian forests of Central Asia, i.e. the Amu Darya State Reserve, which also is a water consumer. Therefore, we estimate the water consumption of agriculture (cotton, wheat, rice, and house gardens) and the natural ecosystems within Lebap Province. Water consumption refers to the actual evapo-transpiration. We use Landsat ETM and TM satellite images, in order to produce maps of the actual evapo-transpiration. Afterwards, a land cover map is laid over the ETa maps, in order to retrieve the ETa of the different crops and natural ecosystems. These results are compared with the water norms and quotas given for Lebap Province.