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“Development on the margin”

Economic Value of CDM Afforestation with Co-benefits in Irrigated Drylands of Central Asia

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Abstract

Increasing water scarcity and cropland degradation endanger rural livelihoods in the irrigated drylands of Central Asia. Establishing Clean Development Mechanism (CDM) afforestation projects is one option to remediate marginal croplands and in turn improve rural incomes. We used Net Present Value (NPV) estimates over seven years of afforestation projects taking into consideration not only the value of carbon sequestered as temporary Certified Emission Reductions (tCERs), but also multiple tree products such as leaves as a fodder, fruits, and fuelwood as a means to increase profits. Opportunity costs of afforestation were estimated by comparing this land use with a cultivation of cotton, wheat, maize, and rice, which are the dominant crops, under various irrigation rates.

At current world price for tCERs (4.76 USD), the profits from CDM afforestation alone ranged between 733 and 5,911 USD ha⁻¹ and exceeded those of cotton and wheat even under an optimal water supply. Rice cultivation was the most profitable among the annual land use options but required large, constant amounts of water, which are unavailable for marginal lands. Nevertheless, the share of tCERs in total revenues, which ranged within 519–913 USD ha⁻¹, was insufficient to cover initial CDM investments. However, given the low demand for irrigation water by trees (6–30 % of that for the annual crops), tCERs could be an additional option to cope with water scarcity. Conversion to CDM afforestation on marginal cropland would save up to 15,000 m³/ha/year of water at the current price of tCER. At the increased price of 44.8 USD per tCER afforestation as an alternative to rice cultivation on marginal land would save annually about 24,000 m³/ha.

Keywords: Marginal croplands, net present value, non-timber products, temporary certified emission reductions