



Adaptation to heavy rainfall events: watershed-community planning of soil and water conservation technologies in Syria

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The Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) and other research, predict a significant future increase in the frequency and intensity of heavy rainfall events in many regions. This increase runoff and soil erosion, and reduce agricultural productivity, as well as increasing risks of flood damage to crops and infrastructure. Implementing adaptation measures and improved land management through erosion control and soil protection are among those that protect water and agriculture and limit their vulnerability. Soil erosion control practices are often based on long-term climatic averages. Special attention is needed to provide protection against average high-return frequency storms as well as severe storms with low-return frequency. Suitable and affordable soil conservation plans, coupled with an appropriate enabling environment, are needed. A watershed and community were selected in the mountainous area of North West Syria. The fields represent the non-tropical highland dry areas and dominated by olive orchards on steep slopes. Farmers were aware of resource degradation and productivity reduction, but lacked financial capital to implement the needed adaptation measures. A micro-credit system was established with the help of the UNDP Global Environment Facility - Small Grants Program (GEF-SGP) with small grants available for each farmer. Haphazard implementation on scattered fields proved inefficient in demonstrating obvious impact. Therefore, each watershed was classified into three erosion risk categories (high, moderate and low), derived from maps of flow accumulation, slope steepness, slope shape and land use. Using field survey of land ownership, the boundaries of 168 farms in the watersheds were mapped. Farmers' fields were classified using the erosion-risk map and considering the on-farm erosion hazard and the off-farm effect on other farmers' fields following the hillslope sequence. More than 60% of the farms were classified into high erosion risk areas. Accordingly, a community-watershed plan was established and revised with the community committee. Loans to implement soil and water conservation measures were distributed to 52 farmers based on the priorities of their farms. Results from four runoff events in 2009 showed that one erosive runoff event can deliver more than 50% of the total soil loss. Implementing semi-circular bunds reduced rill erosion by 40% and captured 3.4 tons of sediments per hectare. The effect of this approach in limiting the negative impact of extreme rainfall events, at watershed and field levels, are now being quantified and modeled.

Keywords: climate change, land use, soil erosion, GIS, flow accumulation, land tenure.