



## Efforts to improve and sustain the productive utilization of dry grasslands in Armenia

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Armenia is a small mountainous country (29,743 km<sup>2</sup>) located in the South Caucasus. It lies in the sub-tropical zone and has a continental climate with hot summers (av. +250C) and cold winters (av. -60C). The average precipitation is 550 mm; in the dry-steppe zone it amounts to only 250 mm and with a rainy season in spring-early summer. Altitudinal variation (390-4,095 m) gives rise to a range of climatic zones (from semi-desert to alpine), soil types and plant communities. Besides, Armenia is situated on the crossroads of Caucasian – mesophyllous (humid) and Armeno-Iranian – xerophyllous (arid) floristic provinces, which has made it to a “biodiversity hotspot”. Agriculture is important as a source of employment and for domestic food supply. The rural population (ca. 1.2 million) is largely dependent on livestock for their livelihood. The principal feed resource is extensive grasslands (60% of total agricultural lands), but past practices of uncontrolled grazing management has led to low grassland productivity and low proportion of valuable legume forages. Improvement of natural grasslands, enhancement of feed quality, prevention of soil erosion and re-establishment of vegetation cover are key socio-economic challenges and are needed to raise the livelihood of rural population in Armenia.

This presentation focuses on present status and trends of dry pastureland degradation, exposed to intensive grazing, and on results from case studies to increase productivity and restore valuable forage species for sustainable use in agriculture. Three different conventional approaches have been applied in these studies including: fertilization with moderate doses of ammonium and potassium nitrate and superphosphate, over-sowing by local legume seeds and implementation of a 2-year rest period in overgrazed areas. From 1986 to 2007, the total yield (TY) in studied dry-steppe pastures decreased by 40%, while at the same time, the proportion of grasses in total yield decreased by 50%, legumes – 70%, but no changes observed in the proportion of unpalatable forbs. The studied drylands showed a high spatial mosaic of the vegetation cover as within the same sampling areas TY varied from 0.4 to 4.2 t/ha. The abovementioned approaches had different effects on total yield and botanical composition in heavily and medium trampled pastures (HTP&MTP) with higher positive biological and economic effect for the MTP. The study also revealed that a 2-year rest of overgrazed areas positively influenced above- and below- ground grass biomass. Impact was mainly determined by individual peculiarities of the studied species. In addition, yields of annual and perennial grass communities increased 1.4-1.9 and 2.4-2.9 times, respectively. It is concluded that total biomass yield itself and, in particular, the proportion of legumes and grasses, could serve as indicators to characterize the extent of dryland degradation and that the tested approaches might mitigate degradation processes caused by uncontrolled grazing management.