



Soil abandonment in artificial soil terraces in marginal areas. Preliminary results of a case of water shortage effect in soils from Sultanate of Oman.

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Soil abandonment is taking place in marginal land areas in Sultanate of Oman. Artificial soil terraces in high elevation rocky mountainous areas left without agricultural activities due to water shortage. Soil terraces have been established approximately 700 years ago and constitute a significant part of the Oman cultural and natural heritage. The present study investigates the soil state in those areas and seeks the possible reasons for the land abandonment. Questionnaires were prepared to interview the opinion of the local people. In addition, meteorological data were gathered to analyze the rain patterns in the area and most importantly, six soil profiles in two different areas in marginal rocky areas of Oman were sampled. The soils are in artificial terraces in Wijma and Hadash villages with elevation of 1247 and 1469 m respectively at mountainous slopes of 20 to 45 degrees. Most of the land was abandoned the last 20 years, while one terrace had agriculture activity 3 years ago. The questionnaires and interviews showed that water shortage was the reason of land abandonment. The rain patterns show a reduction of annual precipitation at least the last 10 years of available meteorological data in the area. The total soil depth in the six soil profiles was between 33 to 70 cm. The main horizons include AC and C and there was a characteristic hard soil horizon in most of the soil profiles with accumulation of carbonate minerals (caliche). The soil pH was mainly alkaline between 7.5 to 8.1 and the electrical conductivity range between 42 to 859 $\mu\text{S}/\text{cm}$. A horizonization in electrical conductivity showed more dissolved solids in lower horizons compare to the upper 10 cm of the soil and this was coinciding with the hard layers in lower soil profiles. It appeared that several hundred years (or maximum 1000 years) old soils showed the development of hard soil layers which are characteristic in arid areas. The upper soil layers showed low conductivity probably due to surface deflation and desert pavement development after the terraces abandonment. The water shortage has probably affected severely the soil characteristics (pavement development and strong wind erosion) and it has enforced the locals to search for alternative domestic income towards lower land areas. Hard soil horizons on those areas showed to have developed in relatively short time after soil terraces construction.