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The role of karstic substratum of ancient mountainous agricultural terraces at the semi-arid environment

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Agricultural terraces are a well-known phenomenon in mountainous regions throughout the globe. Those structures are said to have been in the service of agriculture for several hundred or several thousand years. In different places and environments, terraces had different roles. It has been claimed that its primary goal in the sub-humid and semi-arid environments, was to preserve winter precipitation water within the terrace body. Endemic and domesticated vegetation will then flourish utilizing this resource throughout the dry summer season. Agricultural terraces are widely described in the literature as having three main parts, (a) the base, which is normally a naturally inclined bedrock surface, (b) a manmade retaining wall supporting the weight of (c) the terrace body, usually made of soil and gravel. The terrace base is described in all reviewed literature as an impermeable rock layer. However, previously published calculations suggested that in the sub-humid main mountain ridge of Israel, evapotranspiration will prevent retaining water even in a thick terrace body for the entire summer period. Moreover, in many terraces scattered across the given area, a few centimeters thick soil body seems to support decades and centuries old trees. Therefore, water retention mechanism in the agricultural terraces has been examined. Our study indicate that karst substratum is the controlling factor on terrace water retention. We propose that a well-developed, soil filled, karst system at the terrace substratum impedes the conventional evaporation process of a simple homogeneous soil parcel. Under such conditions, thin body terraces are able to support non-irrigated ancient agriculture water demand in sub-humid environment.