



Ancient to mid-twentieth-century runoff harvesting agriculture in the hyper-arid southern Israel

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Archaeological surveys, conducted during the last few decades across the hyper-arid southern Negev and Arava Valley of Israel, revealed extensive lands with ancient agricultural runoff harvesting systems. Some of the archaeological findings suggest that cereals were the dominant crop. While most of the relics were found in wadis (ephemeral streams), others were located within recharge playas. The terraces and other earth and stone installations were not dated. However, a wealth of agricultural tools and other artifacts indicate inhabitation between the Late Neolithic, Chalcolithic, Bronze, Iron, Roman, Byzantine, Early Islamic, Late Islamic, Ottoman, and modern ages. Also, local key informants testified that Bedouin populations cultivated barley and wheat locally until the mid 20th century. In this study, we assessed the agronomic potential under current climatic conditions. This was conducted by analyzing precipitation (P) and reference evapotranspiration (ET_o) data for the rainy seasons since beginning of the 21st century. Using the ET_o data and the single crop coefficient (K_c) for barley and wheat, crop evapotranspiration (ET_c) and the seasonal soil water deficit (D) were calculated. Hydrological assessments allowed the calculation of potential runoff volumes which would be available for the crops. Overall, the results showed that during the past 17 years, only one to two years were potentially successful for cereal cultivation, indicating that local agriculture is not viable under current climatic conditions. Insights from this study are consistent with other studies which indicate considerably drier climatic conditions at present compared to those in ancient times, and even compared to those in the mid 20th century.