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Revision and preliminary excavation finds of the Early Islamic Plot-and-Berm groundwater harvesting agroecosystem by ancient Caesarea, Israel

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“Plot-and-Berm” (P&B) agroecosystems consist of sophisticated agricultural utilization of a high-water table within loose sand sheets, situated in agricultural hinterlands. Sunken agricultural plots between 3-6 m high sand berms coated with anthropogenic refuse/fines protect them from erosion. The plot level enables easy access to the groundwater for crop roots and shallow well construction, while refuse and organic material enrich the inert sand forming distinct grey sand-loam anthrosols. The agroecosystems require significant resources for construction and maintenance. The earliest recognized P&B agroecosystems are Early Islamic to early Crusader (9th-early 12th centuries a.d.) within several coastal sand bodies of Israel that were abandoned by unclear reasons. Similar agroecosystems in Iberia and Algeria and the southeastern Mediterranean (mawasi) coast historically date to the Middle Ages and early modern period.

Here we reexamine the unpublished data of the only previous excavation (Porath, 1975) and present field and artifactual finds along with pulsed-photon portable luminescence (PPSL) profiling from our 2020 research excavation of the agroecosystem, at the southern outskirts of ancient Caesarea in order to refine understandings on construction materials, structure types and roles, and agroecosystem function, maintenance and timespan.

Berms are found to be constructed from over 3 m thick anthropogenic-mixed sand while their grey sand-loam anthrosol coat is differentially distributed. The ~30 cm thick grey sand-loam anthrosols of the plots still possess distinct contacts with the over- and under-lying sand. Probes in the eastern margins of the agroecosystem reveal sand with Roman sherds. Structural remains include short stand-alone walls, small storage/watching structures, and a unique structure on the western-most berm overlooking the beach with a 3 m deep stone wall and grey sand loam substrate. All of the structures and earthworks possess Early Islamic ceramics along with remains from Roman-Byzantine Caesarea.