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ABSTRACTS

Investigating desert agricultural terrace systems at Early Bronze Age Jawa (Jordan) by using a multi-methodological approach
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Abstract

Recent surveys in the close vicinity of the Early Bronze settlement of Jawa revealed well-preserved remains of three abandoned agricultural terrace systems based on floodwater and runoff irrigation. Besides detailed mapping, sediment samples were analyzed in a multi-proxy approach. The chronology of the terrace systems was gained by optically stimulated luminescence (OSL). In order to evaluate the efficiency of the water management techniques and its impact on harvest yields, a crop simulation model was applied, simulating crop yields with and without runoff irrigation.

Covering a total area of 38 ha, irrigated terrace agriculture was practiced on slopes, small plateaus, and valleys. Floodwater from nearby wadis or runoff from adjacent slopes was collected and diverted via surface canals. The terraced fields were arranged in cascades, allowing effective water exploitation. The terrace fills investigated yielded OSL ages of around 300 ± 5300 a, indicating that the terraces were constructed in the Early Bronze Age I. Increased phytolith concentrations in terrace fills indicate increased plant growth within the terraces. The results of the crop model demonstrate that simulated grain yields increase considerably under supplementary runoff irrigation. Overall, the terrace systems were adapted to the local climatic-, hydrological-, geomorphological- & pedological conditions.

Human role in reshaping the landscape

Ancient terraces of Petra as response to environment

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Abstract

Terraces are ancient manmade agricultural installations that are common features around the Mediterranean. In Jordan, both ancient and modern terraces can be seen within the landscape. Several surveys have recorded various terraces all around Jordan.

In arid Petra, terraces have been considered as elements of hydrological systems or water management systems, yet little attention was given to understanding their overall function. Furthermore little attention was given to investigate the reasons that evoked their creation.

This paper will discuss some of the finds from ancient terrace survey project conducted around the hinterlands of Petra in the period between 2017 -2016. This research advocated for the importance of understanding terraces as a part of Man role in shaping and controlling and utilizing the surrounding landscape as a direct interaction to environmental changes through some case studies.

Terraced gardens with run-off irrigation: a strategy for implementing agriculture in arid environments in prehistoric societies in NE-Jordan and the US-American SW

Bernd Müller-Neuhof (DAI- Orientabteilung)

The implementation of terraces for gardening in combination with run-off irrigation is a strategy for applying agriculture in regions with low precipitation and no access to rivers for irrigation. This strategy has been applied by prehistoric societies in the Middle East and the US American Southwest. One of the earliest known examples derives from the basalt desert of NE-Jordan, where they have been introduced in the late 5th and the 4th millennium cal. BCE. The lecture will describe the possible evolution of this irrigation strategy in the basalt desert, followed by a presentation of the effectiveness of these systems by comparing the structures from NE-Jordan with prehistoric run-off irrigated terraced gardens in the US-American Southwest.

The "Little Petra Winery", an Outstanding Model for Long Term Landscape Transformation for Agricultural Production

Ueli Bellwald

Free Researcher

ABSTRACT

In 2009, surveying the runoff water retention systems built by the Nabataeans in the Beidha area, mainly inside "Little Petra" the author discovered a well preserved, partially still backfilled and not fully excavated wine press at the eastern end of the wadi adjacent to the Western end of "Little Petra". Additional and more surveys in this wadi from – 2010 2014 have revealed the existence of an extended winery occupying its full extension from the Western inlet to the eastern outlet and from the Northern to the Southern cliffs. The most frightening feature which could be discovered was a dam with a height of more than 25 m, closing the outlet of wadi with the winery into Wadi Beidha below the neolithic settlement. It was only the construction of this dam which allowed the set-up of the winery, as it reduced tremendously the gradient of the wadi bed which finally led to the deposition of the required sediments for the plantation of the vines, hence the wadi in its actual topography proved to be a completely artificial, man-made landscape. After having been back-filled, the area was terraced for the plantation of the vines. In the wadi bed a sequence of totally 11 terrace barriers dammed up the runoff water to the level of the terraces laid out for the vines. Due to the remote location of the wadi it was never used again since Nabataean period for any agricultural use, therefore even the terraces laid out for the plantation of the vines are still visible today. In conclusion it may be stated that the newly discovered "Little Petra Winery" is by far the most elaborate model of agriculture by terracing in the Petra area and furthermore it bears witness for a long-term planning and investment in the field of agricultural production.

The terraces of Battir. A case-study for the safeguarding of cultural landscapes in the Middle East

Giovanni FONTANA ANTONELLI

ABSTRACT

Battir is a Palestinian village that lies 7 Km southwest of the Old City of Jerusalem, and is situated on the Armistice Line that since 1948 divides the West Bank from Israel. Local people constructed this landscape through millennia, and cultivated this land using the same farming methods since centuries. Battir's historic rural landscape is characterized by an extensive area of hand-made agricultural terraces, dry-stone walls and ancient irrigation systems that survived until today. The tool for safeguarding of this cultural landscape was the "Battir Landscape Conservation and Management Plan". The Plan is based on the detailed survey of 12 sq. km of terraced landscape and the subsequent classification of its main typologies, which led to designate 'land units'; the latter guided the definition of norms and regulations for landscape conservation and management. The Plan also devised a set of participatory actions for the use of this cultural landscape, primarily maintaining its agricultural vocation, balancing ongoing re-naturalization processes, and complementing traditional practices with new compatible activities, such as the establishment of a "Landscape Eco-museum". The site, awarded the Melina Mercouri International Prize in 2011, was listed on the World Monuments Watch 2014, and in the same year it was inscribed on the World Heritage List in Danger.

GFA Short biography

Giovanni Fontana Antonelli is an architect and town planner graduated from Florence University in 1994. Specialized in conservation and management of historic towns and landscapes, he joined UNESCO in 1998 as a cultural heritage specialist for Sub-Saharan Africa; since 2003, his work focused on Arab cities and contexts (Palestine, Iraq and Jordan). He worked extensively in Palestine (Bethlehem area, Nablus, Jericho, Sabastiya, Gaza, among others). The conservation and advocacy planning for the protection of the agricultural dry-stone terraces and irrigation systems of Battir (2014-2006) was awarded the "Melina Mercouri International Prize for the Safeguarding of Cultural Landscapes" in 2011, and

substantially contributed to the inscription of the “Cultural Landscape of Southern Jerusalem-Battir” on the World Heritage list in 2014. He is currently consultant for the Jordanian Department of Antiquities for the nomination of the architectural and urban heritage of As-Salt on the World Heritage List. He is author of more than sixty scientific articles and co-editor of the two-volume publication “Bethlehem Area Conservation and Management Plan -The Plan as an Alphabet / The Atlas” (Paris: 2012) and the photographic book “The Land That Remains” (Berlin: 2016).

GFA Publication on Palestine’s Cultural Landscapes

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"Investigating two Iron Age agricultural terraces in Faynan/Southern Jordan"

By M.Najjar, K. Knabb, Y. Erel and T. Levy

Abstract

Key words: Iron Age, copper production, environmental pollution, agricultural terraces,

Iron Age is considered as the peak of copper production in Faynan region of southern Jordan. The possible impact of this industrial production on the environment had been attracting the attention of researchers since many decades. Previous studies demonstrated a high level of contamination by heavy metals in the area at smelting and mining sites. During the 2011 season of Edom Lowland Regional Archaeological Project (ELRAP) 38 sediments samples from two farming terrace systems (WF 442 and WF 443), adjacent to the major smelting site of Khirbet Faynan, were subjected to a set of analysis including chemical, isotopic measurements, phytolith analysis and OLS dating to establish their date, their use and the degree of contamination by CU and Ph pollution.

Based on the results of these analysis it will be argued that, although persistently high, the environmental pollution caused by industrial copper production during the Iron Age was restricted to the production locales and slag heaps and that these agricultural terraces had two-fold function of minimizing the heavy metal contamination and pollution of the soils and sustaining the working on copper production population.

New Roman archaeological sites in relation to habitat factors in the Gadara Region Project

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Abstract

As an integral part of the Gadara-Region-Project, a survey of the Wādī al-'Arab region was conducted during the years 2012-2009, by the Biblical-Archaeological Institute Wuppertal and the German Protestant Institute for Archaeology. This was followed by an ongoing analysis of the spatial distribution of these archaeological sites when compared to habitat factors in the same locations.

One distinctive feature of this dataset was the doubling of archaeological sites between the Hellenistic and the Roman eras, primarily by an increase in agricultural installations. It seems that the water technology introduced by the Romans (mainly aqueducts and cisterns) led to the development of upland areas which were previously underutilized due to their distance from natural water locations.

This study assesses the Roman sites in comparison to older sites in terms of proximity to natural water and the development of supplemental water sources by Roman engineering, and the shift from subsistence to industrial agriculture which accompanied the Roman expansion.

'Ancient Farmsteads along the Jabal ash-Sharah and their Agricultural Hinterland'

F. Abudanah – M. Ladurner

The study presented here focuses on the documentation of Nabataean/Early Roman farmsteads and their paleoenvironment. Beyond the evaluation of previous fieldwork, a total of 19 sites along the Jabal ash-Sharah were surveyed during two campaigns in 2014 and 2015, documenting architecture, surface-finds and landscape. So far, this data allows an insight into the typology of architecture, surrounding installation and their relation to the regional and supraregional road network. An additional focus of the project is constituted by the documentation of the surrounding agricultural hinterland of each site, characterized – in all cases – by agricultural terraces and barrages of various types as well as large clearance mounds. Using SFM-technology on the basis of quadcopter photography we documented large areas surrounding each site, in order to get a better understanding of the terracing systems, water harvesting techniques, field sizes and the organization and infrastructure of the agricultural hinterland in general.

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Indigenous Water Harvesting Systems in Jordan

By
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Abstract

It is a widely acknowledged fact that water scarcity is one of Jordan's most pressing problems as a nation. Not only water security is crucial for Jordan's agricultural development, it is also essential for assuring the well-being of its domestic and industries. The limited amount of the available water resources in Jordan made the people rely on the importance of water harvesting techniques long time ago during the Roman and Byzantine era. Archaeologists researchers found many evidences of such practices, such as the collection of rainfall water from rocky land surface, roofs, and watersheds since 4000 years ago. The total area of Jordan is about 90 thousand km², about 87% of this area receives approximately 100mm of rain per year with potential evaporation of more than 2000 mm per year. The total amount of this rainfall on this area is about 8 Billion m³, this indicates the importance of water harvesting in these areas, where more than 90% of this amount is lost by evaporation and drainage if not utilized by means of water harvesting. Since the late sixties, different water harvesting techniques, such as cisterns, hafirs and earth dams, were constructed and widely used in Jordan. In the highland of Jordan, most of fruit trees production depends only on the rainfall. In an effort to encourage Jordanian farmers to adopt more production and stable-land use system, the Jordanian government through the Ministry of Agriculture, Ministry of Water and Irrigation and some other official agencies and in cooperation with international organizations, initiated several programs for soil and moisture conservation and water harvesting projects. The objective of these efforts is to control soil erosion, to ensure better utilization of the limited water resources and to improve and stabilize agricultural production. The objective of this paper is to present indigenous old and new water harvesting systems and recent water harvesting projects in Jordan.

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