



Hotamiş wetland, where the construction of a reservoir to store water from the Göksu catchment is planned.

doi:10.18866/biaa2021.10

Searching for pathways of sustainable water management on the Konya plain

Ender Peker | British Institute at Ankara

Anlı Ataöv | Middle East Technical University

Sıla Özkavaf | Izmir Institute of Technology & Middle East Technical University

Michele Massa | University of Chicago

Davide Motta | Northumbria University

Water scarcity is one of the most significant environmental and humanitarian threats of this century and is also recognised as a major source of conflict, particularly in drylands. Water scarcity is certainly connected with climate change at the global scale, but it is also an outcome of water-resource mismanagement and overexploitation at regional and/or local levels. Advancing sustainable approaches to water management features prominently among the United Nations Sustainable Development Goals (SDGs), either directly (SDG 6) or indirectly (SDGs 8, 11 and 12).

The Konya-Karaman plain is one of the largest agricultural basins in Turkey but is also among its driest areas. Currently the annual rainfall is 240–340mm/year, projected to decrease by 2050 to about 200mm/year, below the lowest limit for non-irrigated agriculture. In recent decades, the widespread use of

wild flooding for irrigation, combined with the cultivation of crops requiring large amounts of water, particularly corn and sugar beet, have caused pressure in meeting the increased water demand for agriculture. This has consequently led to different government-funded responses, adopted in the recent past, such as the expansion of the irrigation systems and the ongoing construction of a large artificial lake (Hotamiş Dam) in the eastern section of the Konya plain, to collect water from another catchment (Göksu) which is located some 160km away. In addition to these attempts, local producers also predominantly use water-well drilling methods, which have led to an excessive number of legal and illegal deep wells extracting groundwater from the plain. This has caused a rapid depletion of the groundwater reserves, in turn leading to marshland drying, the rapid increase of sinkhole formation and desertification.

Thus, the goal of this pilot study is to understand, through a socio-spatial research approach, the current water-management practices in the Konya plain, from the perspective of local residents and communities, agricultural cooperatives and policymakers. This is part of a larger, interdisciplinary effort, which aims to catalyse behavioural change in water usage and support adaptation policies at local and regional levels, currently being made by the British International Research Institutes' (BIRI) Water Management Initiative (WMI). This is an interdisciplinary research network that brings together the BIRI and a diverse group of scholars (geographers, urban planners, social anthropologists, hydraulic engineers, climatologists, archaeologists and historians).

The methodological framework adopted in this pilot study aims to gather local tacit knowledge on agricultural production, water availability, water usage, attitudes toward water use and awareness of water-scarcity challenges. To this end, agro-economists from Selçuk University were interviewed in two Zoom meetings. One was conducted as an in-depth interview and the other as a group interview. In-depth telephone interviews were also conducted in June and September 2021 with the *mukhtars* (village headmen) of two villages on the Konya plain: Türkmen-Karahüyük (located in the Çarşamba river delta, with 727 inhabitants, mainly growing corn, sugar beet and sunflower) and İsmil (in the drier steppe, with 5,828 inhabitants, mainly growing corn). Additionally, fieldwork was carried out in July 2021 which involved meeting with a total of 11 producers who undertake large-scale industrial farming, and among them were six *mukhtars* from the villages of Türkmen-Karahüyük, Karkın, Adakale, Taşağıl, Süngül and Büyükbaşlama. This was followed by a site observation tour in the production fields, guided by the *mukhtars*. Interviews with farmers' associations and cooperatives, and with local and central authorities dealing with water management are planned. The completed interviews and focus groups produced a range of very valuable descriptive and numerical data, based on village farming experiences. The most significant and somewhat eye-opening findings are presented below.

The farmers have confirmed that they have been experiencing first-hand evidence of water scarcity, in the form of increased droughts, less water in the irrigation canals and groundwater table reduction (in the order of metres and with varying magnitude from place to place). They have already adapted their irrigation practices to improve irrigation efficiency and reduce water waste, moving away from wild flooding and opting for the more efficient sprinkler- and drip-based techniques.

They perceive that corn production is not sustainable with the current water resources, but they are not aware that the approach of transferring water from where it is available to where it is limited is not a sustainable solution. Thus, they demand this water transfer, because they see it as the only way out without having to quit their current crop choice.

They are unwilling to change the current crop types, specifically to ditch corn to return to historically grown crops such as wheat and barley, due to the high economic return of corn production. Corn production currently has about twice the economic return of that of wheat, and farmers are reluctant to sacrifice any associated life-quality gains.

There are global actors on the plain, namely Monsanto and Bayer, that are actively pushing for corn production, providing opportunities for conformity in the use of fertilizers and pesticides (without which corn would not grow on the plain). This appears to be an additional factor contributing to the current water-scarcity challenge in the region. However, some producers mentioned that, if the government's valuation of wheat and barley had a higher unit price than at present, they would have opted to grow those crops instead of corn.

In a shift from the past, for instance the Ottoman period when the economic model was self-sustained and products were consumed locally, today's farmers do not eat what they grow industrially (which is destined for export). They do, though, eat what they grow in their back gardens. Interestingly, here, they often apply organic agriculture approaches, including the use of natural fertilizers and no pesticides.

Finally, the producers see the role of researchers being to provide a practically unachievable solution, such as transferring water from other regions, that would allow for the maintenance of the current industrial agricultural production model by ensuring that water resources are available to support it.

This pilot study is contributing data for computation and validation of quantitative and comparative water-budget analyses for the 16th century CE, today and end of this century for the Konya plain, within the context of the ongoing British Academy-funded Fragile Landscapes project (see pages 20–21). Most importantly it has revealed that any attempts to implement change in behaviour and policy regarding water management in the region will have to take into account economic factors and the life-quality expectations of farmers.



Ender Peker and Anlı Ataöv meet with local farmers in Çumra in July 2021.